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FineScale MODELER

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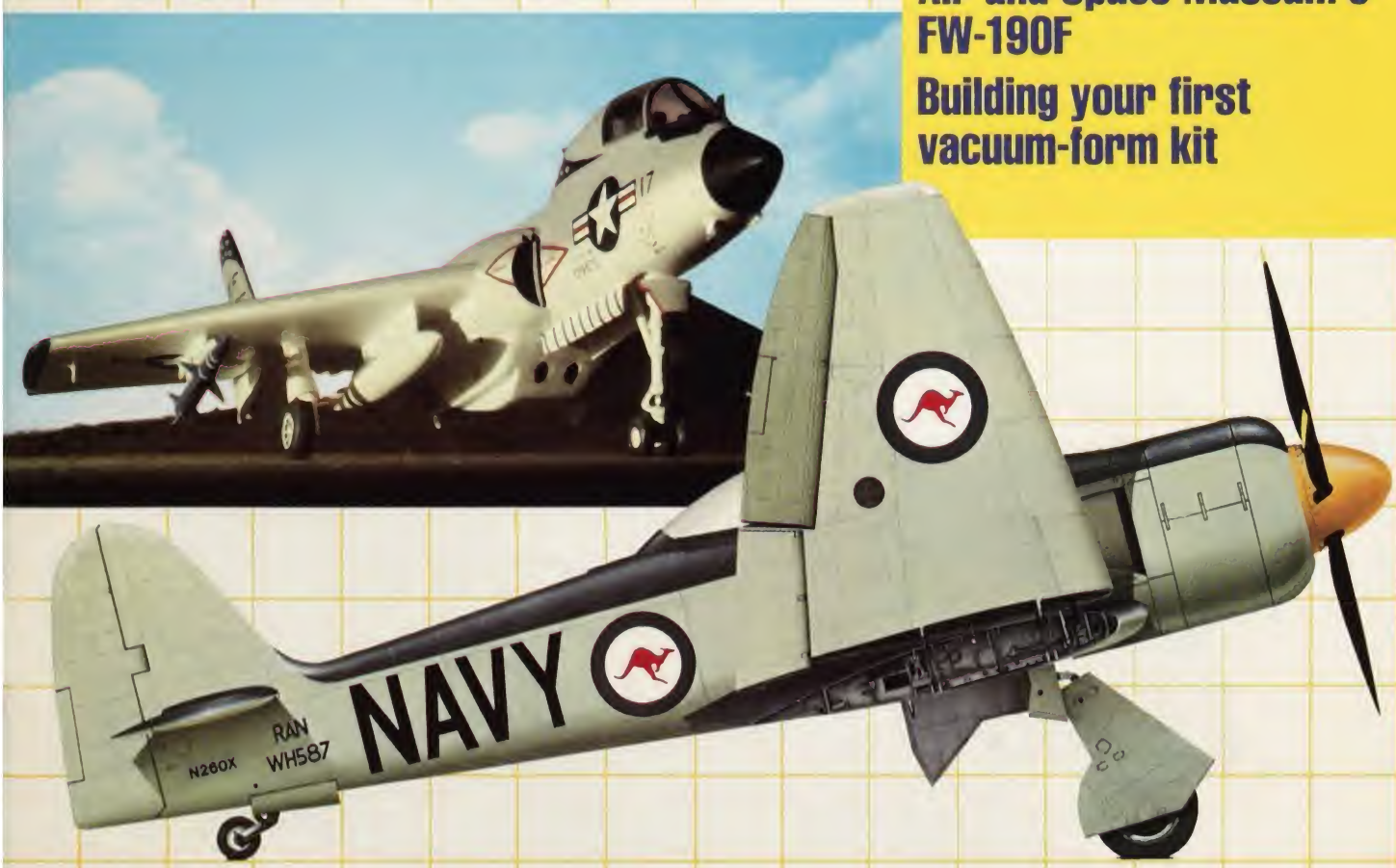

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Research data: the Hawker Sea Fury . . . and more how-to-do-it modeling techniques and information

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SPRING 1982

ON THE COVER

Three examples of fine work: Steve Zaloga's scratchbuilt 1/76 scale M1 Abrams tank, E. Richard Staszak's 1/72 scale vacuum-form F7U-3M Cutlass, and Ken Sommerfield's detailed painting of the Hawker Sea Fury.

FINESCALE MODELER (ISSN 0277-979X) is published by Kalmbach Publishing Co., 1027 N. Seventh Street, Milwaukee, WI 53233, (414) 272-2060. FineScale Modeler assumes that such material as letters, club news, new-product information, etc., is contributed gratis. Feature articles and scale drawings are paid for on acceptance. Photographs accepted separately are paid for upon publication. Leaflets outlining in detail the preparation of features, photographs, and drawings are available on request from the editorial secretary. Unsolicited material, if not accepted, will be returned only if postage and wrappings are provided for this purpose. FineScale Modeler assumes no responsibility for the safe return of unsolicited material.

A hearty welcome!

WELCOME to FINESCALE MODELER, a magazine created to bring you the best in modeling techniques. You're probably wondering about our title, specifically about its use of the word "fine" to describe the modeling FSM covers. We chose "fine" because it best describes the quality and accuracy that careful modelers put into their work. Fine modeling is on a par with fine china, fine fabric, and fine silver; the common denominator for all is craftsmanship.

It's the approach to modeling, not just the results, that interests us at FSM. The difference between mass-produced and one-of-a-kind, the difference between common and special, is technique, and technique is the focus for FSM. This magazine is written and edited for the modeler who wants his next model to be just one bit finer than his last, or even the one he's working on right now. And we think that's you.

This is your magazine, and I'd like to hear what you want in it, and, for that matter, what you'd like left out. I'll try to answer every letter, and if you'd like to suggest articles for future issues, or if you'd like to contribute some of those articles yourself, by all means say so.

One final note, a technical one. Several FSM authors refer to colors using the letters "FS" followed by a 5-digit number. The reference is to Federal Standard 595a, a government color-matching document. Many modelers are already using this color reference system, and at least one hobby paint manufacturer will release a new line of Federal Standard colors this year. If you want your own copy of Volume 1 of the standard, which includes several hundred small color chips, the document is available for $5.50 from the General Services Administration, Specifications Distribution Branch, Building 197, Washington Navy Yard, Washington, DC 20407.

Again, a hearty welcome to the pages of FINESCALE MODELER!

Bob Hayduk

Editor

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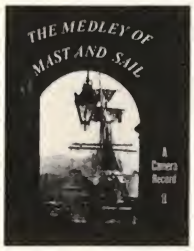

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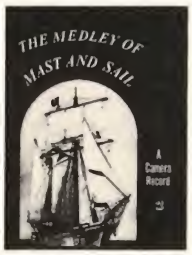

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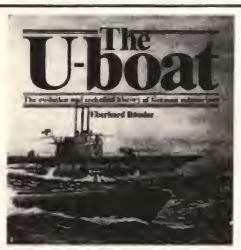

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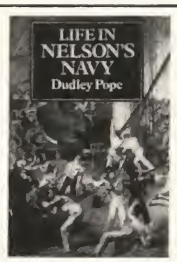

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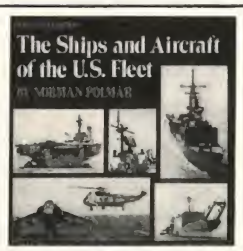

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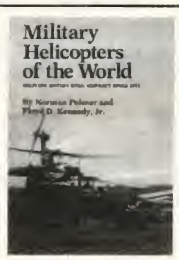

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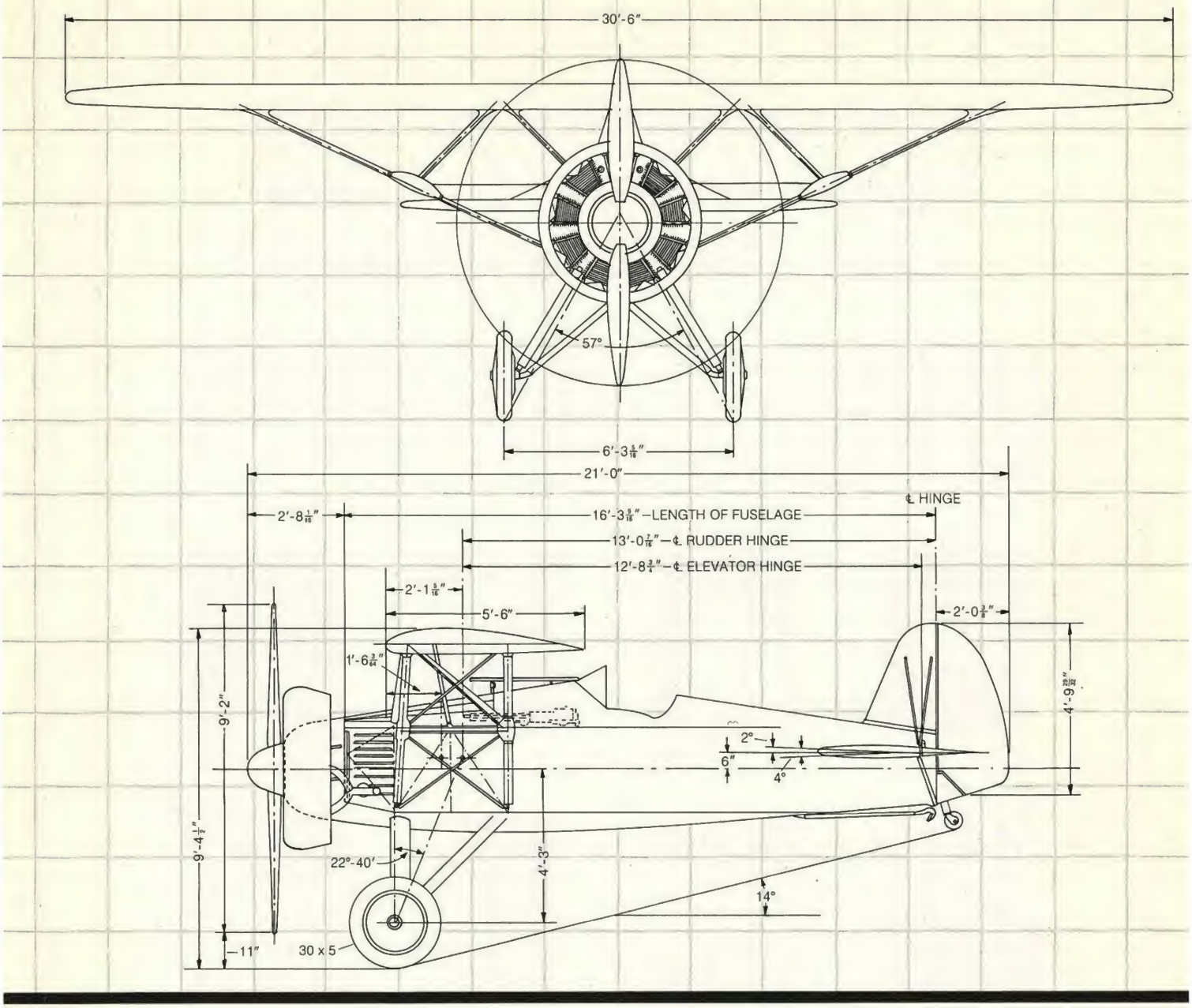


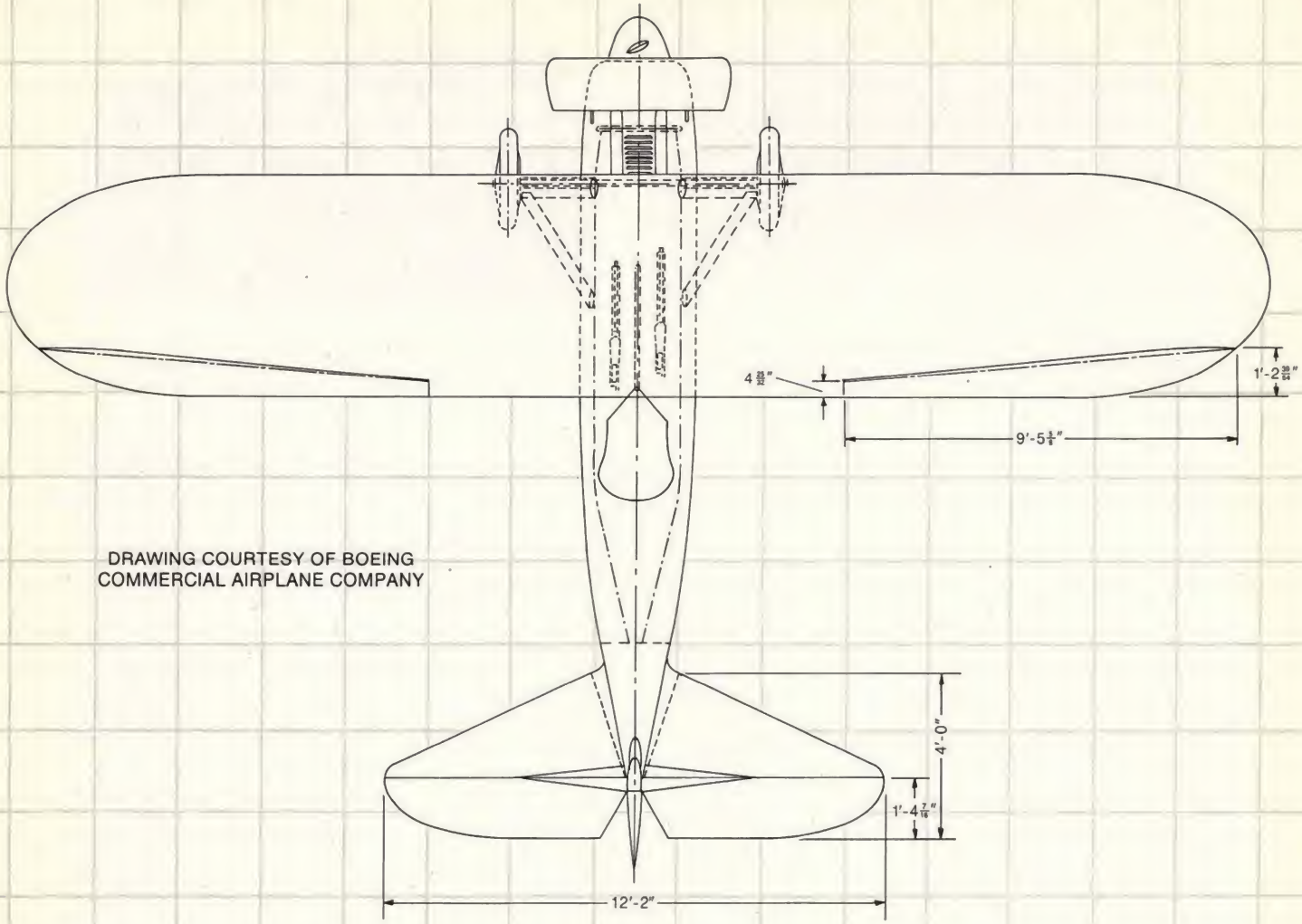
Modeling Boeing's daring parasols

Converting a P-12E to the U. S. Navy's one-of-a-kind XF5B-1

BY NED BARNETT

YOU'RE PROBABLY FAMILIAR with the Boeing F4B (Navy) and P-12 (Army) series of fighters. In a late production version, Air Corps designation P-12E, these doughty pursuits had a top speed of 189 mph at 7,000 feet, a service ceiling of 26,300 feet, and a maximum range of 580 miles. That was hot for the 1920s, but Boeing realized that the days of wood-and-fabric biplanes were numbered.

Engines were approaching 600 hp, more than wood and fabric could support. The box-truss biplane wing designs that had previously dominated fighter development were strong, but caused increased drag and other aerodynamic inefficiencies. Boeing engineers recognized that only all-metal monoplanes could handle the stresses imposed by ever-more-powerful engines,



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COMMERCIAL AIRPLANE COMPANY

SCALE: 1/48

and that they would be far more efficient than any biplane.

Accordingly, as a private venture, Boeing manufactured two prototype fighters, each featuring all-metal construction and a single parasol wing. Both were delivered early in 1930. One of the planes, Boeing model 202, civil registration X-270V, remained Boeing property but went to the Army and received Air Corps unofficial designation XP-15. The other prototype, Boeing model 205, civil registration X-271V, was purchased by the U. S. Navy and designated XF5B-1.

Externally, the planes were apparently identical except for the removable arrester hook on the Navy version. Both were powered by a Pratt & Whitney R-1340 radial engine: The engines were originally uncowled; a ring

U. S. Navy

The author's model represents this plane, the XF5B-1, as it appeared in April 1930 with the rounded vertical stabilizer and a large engine cowling.

U. S. Air Force

The Army's XP-15, X-270V, was externally identical to the XF5B-1 except for the absence of an arrester hook, so Ned used a photo of the Army plane when modeling details on the right side of the fuselage. Note the unusual structure of the forward landing gear, the triangular brace inside the cowling, and the wires supporting the vertical and horizontal stabilizers.

cowling was later added to each. Both planes originally had a squared-off vertical stabilizer which was soon replaced by the larger and rounder vertical stabilizer used on the F4B-3. Both were tested with several variants of the R-1340 engine.

The XP-15 and XF5B-1 performed only slightly better than late-model F4Bs, so neither service ordered additional copies. The Army plane lost half a propeller in flight and crashed on February 7, 1931. The Navy plane was eventually stress-tested to destruction in 1932. Although Boeing received no production contract, the experiment was successful: The company gained valuable experience with new design and construction techniques.

Research — When I decided to model the XF5B-1, I was immediately confronted by the fact that the prototype was destroyed years ago, and I anticipated a tedious search for data. Fortunately, a search of aviation book catalogs, conversations with fellow modelbuilders, and correspondence with Congressman Floyd Spence of South Carolina (my home at the time) uncovered several valuable sources. Information gathering took months, but it wasn't tedious. Here are the sources I found most useful:

- *U. S. Naval Fighters/Navy-Marine Corps, 1922 to 1980s* (Aero Publishers, Inc., 1977). This book is by Lloyd S. Jones, an active IPMS member and decal manufacturer, and contains photos, drawings, and descriptions of every U. S. naval fighter.
- *U. S. Fighters/Army-Air Force, 1925 to 1980s* (Aero, 1977) is also by Lloyd Jones and covers land-based fighters.
- *U. S. Navy & Marine Corps Fighters, 1918-1962* by Bruce Robertson and Paul R. Matt is similar in content to Jones' book, was originally published by the British firm Harleyford in 1962, and is distributed in the U. S. by Aero. It contains excellent text, drawings, and photos.
- *Boeing P-26 "Peashooter"* by Edward Maloney (Aero, 1973) contains many photos of the R-1340 engines that were used in Boeing models 202 and 205, so it's useful for superdetailers. Aero's address is 329 West Aviation Road, Fallbrook, CA 92028.
- The U. S. Air Force Museum, Wright Patterson AFB, Dayton, OH 45433, supplied a photo of Boeing model 202 and conjectural color scheme information for this plane.
- The U. S. Navy supplied a photo of model 205.
- Ray Sweet, Editor of *Dirty Plastic*, the newsletter of the Arizona Historical Modelers Society, IPMS, supplied scale drawings of models 202 and 205 that he'd prepared for *Dirty Plastic*.
- Boeing Commercial Airplane Company (P. O. Box 3707, Seattle, WA 98124) not only supplied photos, but also sent copies of original factory drawings, complete with dimensions! I deeply appreciate Boeing's extraordinary generosity. The drawings have been redrawn and are reproduced on pages 6 and 7.

Kits — I started with the Hasegawa P-12E, the only 1/32 scale kit of that plane I'm aware of. Entex manufactures a 1/48 scale F4B, Monogram produces a 1/72 scale F4B, and Lesney/Matchbox makes a 1/72 scale P12-E. If you're going to build in 1/72 scale, buy both and use the best parts from each kit.

I used the Hasegawa kit parts as much as possible, but nearly all parts had to be extensively modified. For example, the ailerons had to be repositioned and the fuselage had to be sawn apart and rebuilt in the cleaner shape of the XF5-B1. Many parts, such as the wing struts, were scratchbuilt. I built by subassemblies, then brought these together in final assembly. Paint and decals came last. Let's discuss the modifications to the wing first.

Wing modifications — The all-metal parasol wing on models 202 and 205 had almost exactly the same planform as the P-12E and used Boeing airfoil No. 106 (similar to the Clark Y). The wing featured 38 equally spaced reinforcing ribs on the top and bottom. The ailerons extended all the way to the wingtips, and were not rectangular. I prepared templates of the new ailerons, transferred their dimensions to the wing at the new locations, and cut out the molded ailerons with a razor saw and hobby knife. I moved the ailerons to their new positions, and filed and sanded until they fit correctly. At all times, I was careful to preserve the molded corrugated-metal texture on the ailerons. I filled the gaps left by relocating the ailerons with sheet plastic and body putty and kept filling and sanding until the wing was again perfectly smooth.

I decided to scribe the locations of the metal wing reinforcements, rather than build them up. After penciling the locations of the reinforcements onto both wing surfaces, I scribed the reinforcements with the back of a hobby knife blade guided by a metal ruler. I often hold the straightedge to the work with masking tape to ensure it can't slip. When I did make mistakes, I repaired the damage with reinforced putty.

Reinforced putty, what's that? It's simply an ordinary putty, say Green Magic Putty or Duratite Plastic Surfacing Putty, applied as usual, but reinforced after it dries with a drop or two of cyanoacrylate cement such as Hot Stuff or Jet. The cement hardens the surface of the putty, making it resistant to chipping.

I then drilled and filed the handhold in the wing and added the aileron-actuating rods and their housings. I made the housings from lengths of K&S Engineering brass tubing, filed to shape. The rods are pieces of sprue.

Some photos of the XF5B-1 (and the Army plane) show a long pitot tube assembly mounted on the left wing half leading edge just above the main strut attachment. I decided to leave it off my model, but you could make this from sprue or music wire.

Fuselage — I had to rebuild most of the fuselage. I marked the P-12E fuselage halves and, using a Dremel table saw, cut off the turtle deck behind the cockpit, the lower wing mount, and the

Both photos, FINESCALE MODELER: Bob Hayden

Almost half the work on the XF5B-1 model went into building the wing and landing gear struts from streamlined tubing. The fairings are epoxy putty.

deck in front of the cockpit. To reconstruct the fuselage contours, I built bulkheads from sheet plastic, then applied many layers of Duratite Plastic Surfacing Putty, letting each coat dry before applying the next. I like Duratite for this because it dries quickly and sands easily. However, in my experience, it tends to pit. For this reason, I use Green Magic for the last layer. Green Magic doesn't pit and can be feathered to a fine line.

Fuselage details — Fuselage detailing called for educated guesswork because the only good close-up of the left side is a photo of the Navy plane, while the only good close-up of the right side shows the Army version! I had to assume that the venturi tube near the cockpit and the exhaust port on the Army plane were also on the Navy plane I modeled. I think this is a reasonable assumption because the aircraft were so nearly identical, but unless somebody finds more photos I can't be certain.

Because I had no photos of the XF5B-1 cockpit interior, I accepted the

Meet Ned Barnett

Ned Barnett has been a member of the International Plastic Modelers Society/U. S. A. since 1966. He was Editor of the Atlanta chapter's newsletter in the late '60s, and has served as IPMS National Secretary and Editor of the IPMS *Quarterly*. Ned's modeling interests include aircraft, ships, figures, armor, and dioramas.

Professionally, Ned is Vice President of the Tennessee Hospital Association in Nashville. His duties include writing, photography, graphic design, and public relations.

P-12E kit cockpit as "good enough for government work." I reworked the coaming and added a headrest. I made the gunsight from aluminum tubing and pinstriping tape (wrapped around the end to form the eyepiece), and made the lens from Micro Kristal-Kleer.

I cut footrests and shell ports for the guns into the fuselage and backed these openings with sheet plastic and putty. I drilled lifting holes toward the rear of the fuselage and added cooling gills to the forward fuselage. Finally, a virtually invisible (in photos) air scoop was added to the nose just below the engine.

Engine — The engine and cowling came next. I treated the gun tubes, which had to be carefully aligned with the engine, as part of this subassembly, even though they are mounted on the fuselage. Boeing drawings show that the XF5B-1 carried two .30-caliber machine guns mounted inside the fuselage in front of the cockpit. (According to Robertson and Matt, the armament could also be one .30-caliber and one .50-caliber machine gun.) Bullets passed down thick tubes that flanked the top cylinder. The same arrangement was used on the P-12E. I made these tubes from aluminum tubing set into the fuselage.

After a lot of test fitting, I discarded the Hasegawa P-12E kit engine and cowling in favor of the engine and cowling from the Hasegawa kit of the Boeing P-26. Both engines are Pratt & Whitney R-1340s, and I felt the engine in the P-26 kit was more detailed. As I mentioned, the Aero book on the P-26 contains close-up photos of an R-1340 on a restored P-26, so it is useful.

Again relying on the left- and right-side Navy and Army photos, I modified the exhaust system to agree. I test fit the engine, gun tubes, and exhaust ports until everything was perfectly aligned.

Struts — I bought several sizes of K&S streamlined tubing in the flying model section of my hobby shop and built most of the wing and landing gear struts from sections of it. The best way to cut this tubing is to use an abrasive disc on a hand grinder (such as a Dremel Moto-Tool). Hold the tubing in a vise, and wear safety glasses. You can also use a razor saw, but the metal quickly dulls the blade. A large fine-toothed flat file is good for final shaping.

I made the smaller struts with pieces left over from an ancient kit of a Martin MB-2 bomber by Ringo. (Remember that one?) You could make similar struts from sections of helicopter rotor blades.

Duro E-pox-e Ribbon putty, a clay-like epoxy filler which is sold in many dime stores and hardware stores, provided material for the strut fairings. A similar product is sold in auto parts stores as gas tank sealer. If you follow the instructions, this material can be easily worked with your fingers. After the putty cures, it can be sanded, filed, carved, and drilled. It's strong and bonds well, so it's perfect for modeling.

It took a lot of work to get the wing struts right; each piece had to be measured, cut, beveled, and test fit, often several times, until it fit perfectly. Music-wire braces were installed after painting and decaling.

Landing gear — I built the forward landing gear from kit parts, pieces from my scrap box, and streamlined tubing. In the photos, note the unusual configuration of the cross braces, a feature not revealed in most drawings.

The tail wheel and arrester hook are kit parts modified to match drawings and photos. The landing gear parts are sturdy — a good thing with a model that's about half putty!

Tail — Boeing factory drawings show model 205 with both the squared-off and the rounded vertical stabilizer; I chose the rounded version and modified the P-12E kit part accordingly. The rigging wires between the vertical and horizontal stabilizers are music wire, bent to shape with needle-nose pliers and installed after painting and decaling.

Priming and scribing — Because of the amount of cut-and-fit that went into the construction of this model, it was pointless to paint the subassemblies before final assembly — and the devil's own job to paint the model after assembly. However, before final assembly, all parts were primed and repaired — the prime coat brought out a few defects — then re-primed. At this stage, all panel lines were scribed into the fuselage, a time-consuming task. I used scale drawings in Lloyd Jones' book and photos to determine the locations of panel lines. Photos reveal that the XF5B-1 was smooth-skinned, so these panel lines are not particularly prominent.

Color scheme — No one seems to know how the XF5B-1 was painted. After studying the color schemes on other Navy fighters of the period, I elected to use chrome yellow (Humbrol Yellow Facings, MC 2) and rich blue (Floquil Dark Blue, R50). The prop is Floquil Bright Silver (R100) and the wheels are Floquil Grimy Black (R13). The yellow and blue were oversprayed with semigloss varnish. Photos show that the plane was carefully maintained and appears to have been frequently polished: That's why I didn't weather my model.

All civil registration numbers are individual decal characters, applied by the Micro system and sealed with a spray coat of semigloss varnish. My model has no national insignia or Navy markings. The Boeing logotype on the fuselage (oversized, but what the heck — Boeing often used huge logos at this time) came from the decal set with the Williams Brothers Boeing 247 kit. Photos reveal markings on propellers and struts that vary from one picture to the next, so I simply used decals from the P-12E kit.

Was it worth it? — Building the Boeing XF5B-1 provided many hours of modelbuilding fun and I now have what may well be the only model of this distinctive aircraft (so far). Yes, I think it was well worth the time and effort. **FSM**

Black-and-white photos show that XF5B-1's fuselage was a dark color, while the wing, struts, landing gear, and tail were lighter. Based on color schemes used on other Navy planes of the period, Ned decided the colors were probably blue and yellow.

Both photos: FINESCALE MODELER, A. L. Schmidt

The author's 1/76 scale Abrams is largely styrene sheet, but includes a handful of molded parts, photoetched brass grilles, and a metal tubing gun barrel.

Scratchbuilding the M1 ABRAMS Main Battle Tank

The angular lines of the Army's newest tank make it relatively easy to build from sheet styrene. The author's version is 1/76 scale, but his techniques work just as well for larger models

BY STEVE ZALOGA

IN 1981 the first M1 Abrams tanks were issued to troops of the 1st Cavalry Division at Fort Hood, Texas, marking the service debut of America's newest tank. The M1 is named for General Creighton Abrams, commander of U. S. forces during the Vietnam War. General Abrams is equally well known among armor historians as commander of the 37th Tank Battalion of the crack 4th Armored Division, one of the best tank battalions in World War II.

Although the M1 is comparable in firepower to the older M60A3 tank, it represents dramatic improvements in mobility and armor protection. The M1 is capable of speeds in excess of 50 mph on roads and about 30 mph cross-country, and its stratified steel-ceramic laminate armor is nearly invulnerable to frontal attack by infantry antitank weapons that rely on shaped-charge warheads, such as the Soviet RPG-7 or 9M14M Malyutka (Sagger).

Deciding to build from scratch — No kit of the M1 has yet been released, but because of its design, the tank makes a good first-time scratchbuilding project. The stratified armor gives the M1 a clean, slab-sided appearance, and on a scale of 1 to 5 (with 1 being easy to scratchbuild and 5 being difficult) I would rate the M1 at about 1.5. Any modeler who has a fair amount of experience in armor modeling, including detailing and conversions, should have no trouble building the Abrams from scratch.

I built my model in 1/76 scale. Although this scale is not as popular

among armor modelers in the U. S. as it is in Britain and Canada, it is well suited for scratchbuilding. In my experience, scratchbuilding a 1/76 scale tank takes about as long as building and adding detail to a 1/35 scale tank kit. Besides, I derive a great deal more satisfaction from my scratchbuilt models than those I've built from kits, and my choice of subject matter is not limited to those tanks the kit manufacturers have chosen.

To begin, study the accompanying scale plan and photos, and think out your approach to building the model and the materials you will use for each part. I used .015" styrene sheet for most of this project, because it is thick enough to provide sufficient structural rigidity, yet thin enough to cut easily with a single-edge razor blade. If you think that .015" sheet is too thin, you might substitute .020", but don't go any thicker.

The first step in construction is to transfer dimensions from the scale plan to the plastic sheet. If you've never done this before, first draw each part on tracing paper, then transfer the shape to the plastic. Accurate shapes for horizontal and vertical plates can be traced directly off the plan, but sloping plates must be constructed using measurements taken from two or more views. Experienced modelers should have no trouble lifting dimensions from the plan with dividers.

Building the hull — The basic hull consists of the floor, two sides, two lower bow panels, two rear panels, and a few bulkheads to keep the hull sides perpendicular and to add strength, fig. 1. Cut all the pieces before assembly, then glue them together using liquid plastic cement. Under no circumstances use tube-type (jellied); it causes severe problems when the time comes to finish the joints between plates.

I began the upper hull superstructure by adding a rectangular sheet of plastic to the hull assembly to serve as a base for the rest of the assembly. To this I added a piece cut from .040" sheet which includes the turret ring and the center of the superstructure roof, fig. 2. At the rear I added the engine deck side and rear panels, leaving the engine deck roof for later. I also added several bulkheads to keep the sides perpendicular.

The trickiest aspect of building the hull is adding the main glacis plate and the two shallow sloped plates on either side of it. The glacis plate incorporates the recessed driver's hatch. I scribed in the hatch using the sharp point of a pair of dividers, then deepened the recess with a knife.

Joints between plates — The joints between angled plates are important. It's easy to make neat joints where the plates meet at right angles, but where the angle is acute or obtuse the joints present problems. If you are not careful, you'll either be left with gaps between plates that are difficult to fill, or you'll end up with structural weaknesses caused by gaps behind the joint. Figure 3 shows how it should be done. To make the plates match properly, scrape the edge of one until you have the proper angle; the edge of the other plate can be left with a right angle.

The engine deck — I did not add the engine deck roof when I built the rest of the upper superstructure because I wanted more time to detail it. The M1 engine deck is flat and fairly dull, so I expended some special effort to liven it up. Rather than scribe the panels onto the deck with a razor saw or knife blade, I made them by laminating. This results in panels with much sharper definition than is possible by scribing.

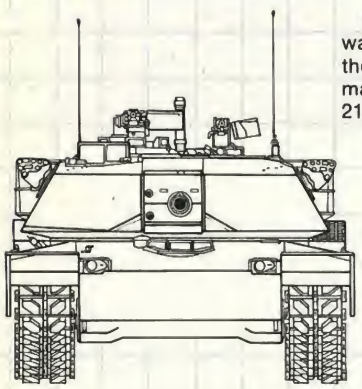
First, I added the basic engine deck

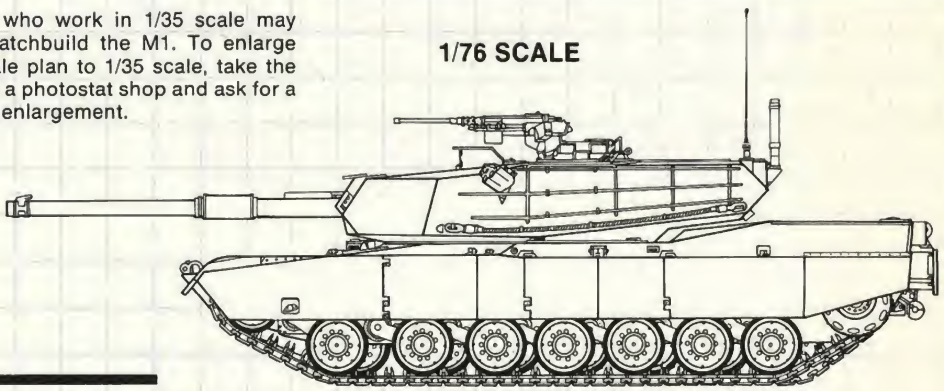
SPECIFICATIONS

Length (hull)	310.5"
Width	144"
Height (to turret roof)	93.5"
Ground clearance	19"
Track width	25"
Combat weight	60 tons
Ground pressure	13.3 psi
Maximum speed	45 mph
Engine	Avco 1500 hp turbine
Fuel	diesel
Operating range	275 miles
Crew	4
Primary weapon	105 mm rifled cannon (M68)
Coaxial weapon	7.62 mm machine gun (M240)
Loader's weapon	7.62 mm machine gun (M240)
Commander's weapon	.50 caliber machine gun (M2)
Ammunition storage	105 mm — 55 rounds 7.62 mm — 11,400 rounds .50 cal. — 1,000 rounds
Smoke generation	M250 grenade launcher, integral engine smoke generator

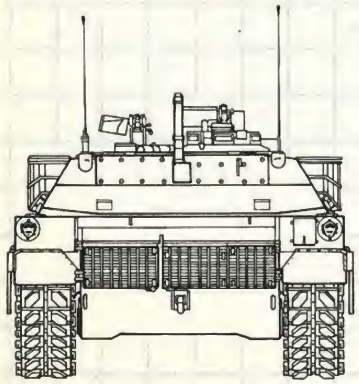
Modelers who work in 1/35 scale may want to scratchbuild the M1. To enlarge the 1/76 scale plan to 1/35 scale, take the magazine to a photostat shop and ask for a 217 percent enlargement.

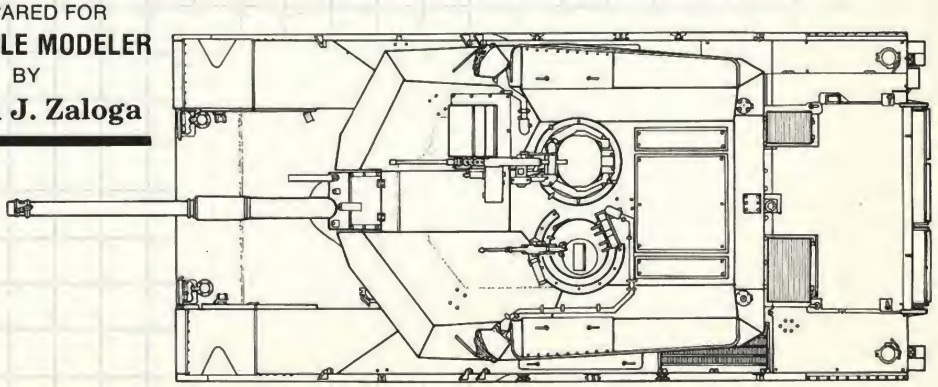
1/76 SCALE





PREPARED FOR
FINESCALE MODELER
BY
Steven J. Zaloga





This production M1 clearly shows the commander's station on the turret roof, the large flash suppressor over the coaxial machine gun, and the prominent hull skirts.

(Above, below, and bottom) The XM1 prototype, unveiled at Warren, Michigan on February 3, 1978, differed from the production version shown in the drawings in several details. This is the "snow-open terrain" camouflage scheme.

Three photos: Chrysler Corporation

(Above) These close-ups show the drive sprocket and track detail, the grilled exhaust ports, and the folded wind sensor and canvas webbing on the rear of the turret.

M1 Abrams

FIG. 1. The basic hull assembly includes three internal bulkheads to keep the sides perpendicular.

FIG. 2. Here the upper hull superstructure has been added and the joints puttied. Note the gaps where metal air intake screening will be added later.

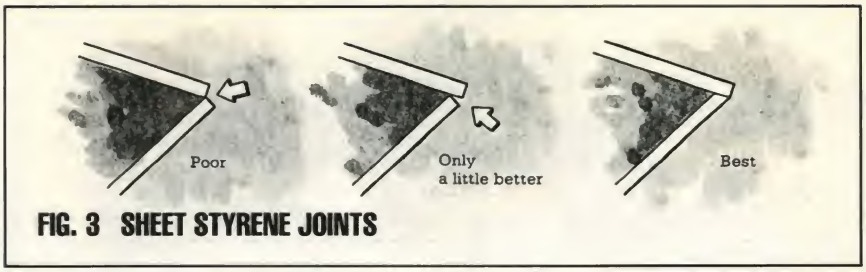


FIG. 3 SHEET STYRENE JOINTS

to the hull, recessing it approximately .015″ below the upper edge of the hull sides. The easiest way to do this is to add a ledge made of plastic strips around the edge of the engine deck area, providing something for the deck to rest on. Cut holes for the engine deck air intakes before gluing the deck to the hull. Next, glue the various panels onto the sub-deck, leaving narrow gaps between each. Adding the bulge on the left side of the engine deck, alongside the long air intake opening, completes the basic hull assembly except for puttying gaps and fairing in the area around the turret ring.

Building the turret — The turret assembly is the most difficult part of this project, and even it isn't all that hard. The problem with the turret is its abundance of plane surfaces, many of them set at shallow angles to one another.

I began the turret with a seven-piece former, or skeleton, fig 4. The two basic parts are .040″ styrene discs 33 mm and 40 mm in diameter. I cut the discs using an ordinary drafting compass fitted with a cutting blade in place of the lead. These blades, which are usually used for cutting frisket, are available at graphic arts supply stores. The best way to use them is to position the squared-off back edge of the blade against the work so that it will scrape away material in the same fashion as a scribing tool.

Next, I drew up the main formers on tracing paper to get the proper cross sections and angles, then cut each one from .015″ styrene. I included narrow grooves in each former so the whole turret skeleton would interlock even without glue, but cemented the formers together once I was certain everything fit properly.

With the skeleton complete, I first added the main roof panels, then followed with side panels, fig. 5. Next I began to add the remaining roof panels by carefully measuring and dry-fitting each piece before assembly. Finally I turned my attention to the turret bottom and added the panels there, completing the turret, fig. 6.

Assembling the hull and turret took me about 15 hours, and in the process I ruined one turret skeleton which had to be discarded and replaced by a more carefully assembled one. At this point the basic assemblies had many small gaps and imperfections which required puttying and sanding. After performing this work, I sealed the putty by airbrushing the model with a primer coat of Floquil Railroad Color before proceeding with detailing.

Suspension and track — I used wheels and torsion bar arms from the Airfix Leopard kit, which are quite close to those of the M1 in size and detail. To ensure that the road wheel bogies would line up at the right height, I built a false floor and box, fig. 7, on which to rest the hull while positioning the wheel assemblies. Once the cement on the suspension parts dried, this temporary fixture was removed. The Leopard torsion bar arms are a bit too short for the M1, which will bring the bogie assemblies too close to the hull sides unless they are shimmed out with small mounting blocks of .040″ styrene, fig. 8.

Just like the rigging on a ship model, track detail either makes or breaks a small-scale tank replica. The Airfix Leopard track is acceptable for the M1, but I prefer scratchbuilt track because its detail is much sharper and crisper. On the other hand, scratchbuilding track is time-consuming; of the 50 hours I spent building my M1, at least 15 were spent on the track.

Figure 9 shows how the track goes together. First, I cut a strip of .010″ styrene 7 mm wide to form the core. Next, I scribe a piece of .015″ sheet at 2.5 mm intervals. (Evergreen Scale Models* offers a variety of pre-scribed styrene sheet. The line is available at some model railroad shops.) After scribing, I cut the sheet into strips 1.5 mm wide and glue two of them down the center of the core strip, leaving a narrow gap for the guide horns.

Now comes the tricky part. The inner face of the M1 track partly exposes the track pins to view. The exposed portion looks something like an "E" with the right side closed off. Building several dozen of these tiny assemblies piece-by-piece would be about as much fun as going to the beach to count grains of sand, so I settled on making

* Evergreen Scale Models, 2685 151st Place, Redmond, WA 98502

FIG. 4. The turret skeleton mounted on the hull. The frame consists of five interlocking pieces and two turret discs.

FIG. 5. After adding the two large top plates and the side sections, the turret looks like this.

FIG. 6. The bottom of the turret after adding the final panels and filling and sanding all the joints.

FIG. 7. The hull, upside down, with the spacer used to align the suspension.

FIG. 8. The basic hull, turret, and suspension, again with the temporary spacer for aligning the suspension attached.

them using a "slice-the-loaf" method.

The slice-the-loaf technique — The first step is to make the "loaf" from .010" styrene strip. Three strips are carefully cemented to a fourth, then the assembly is completed with a fifth strip, making a long rectangular tube with a divider up the middle. The best way to keep the three middle strips separate and parallel is to place a lightly oiled steel ruler between them while gluing, and then carefully remove the ruler before the assembly dries. It is very important that liquid glue be used sparingly on this assembly, otherwise the thin plastic will collapse into a messy plastic puddle.

After assembling the loaf, allow it to dry for at least a day. Then, using a sharp, brand-new single-edge razor blade, cut .010" slices from the loaf to make individual track pin pieces. It's critical to keep switching to new razor blades as you slice the loaf, because a blade that is even slightly dull will crush the loaf instead of cutting it. A loaf 3" long was adequate for the M1 track.

Glue the track pin pieces to the track core next to the scribed strips. Next, add end connectors along the outside edge of the track core. The connectors are oval-shaped, and I made them by scraping the corners of a 1.5 mm-wide strip of .030" plastic to round off the edges, then slicing the oval-section strip to make the individual pieces. The end connectors complete the detailing of the inner face of the track.

The outer face of the track is easier to make. The detail here is not as complicated as on the inner face, and only short sections of it will be visible on the completed model. First, cut several dozen 2 mm x 3 mm rectangles from .010" styrene. These are the basic track pads. Add a track cleat to each pad by gluing a 1 mm-wide strip of .010" plastic diagonally across the pad, then trimming away the overhang.

Add the pads to the outside surface of the track core, leaving a small gap down the center and a gap between each track pad. Don't forget that half the cleats must lean in one direction, the other half in the opposite direction. The track is now ready to attach to the suspension (the track guide horns could be added at this stage, but I waited until later).

Installing the track — Because the track is styrene, it can be attached to the suspension components with liquid cement. Install the sections that run around the wheels by cutting the track strip and attaching individual links. There is no need to make a full track loop, since the upper sections will not be visible after the side skirts are added. I would rather spend time putting on visible detail than waste it on areas that can never be seen.

The last two items to add to the sus-

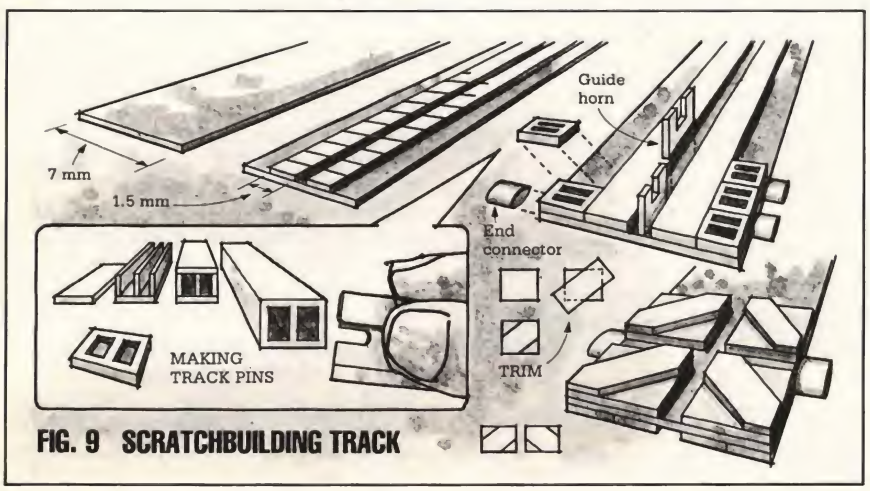
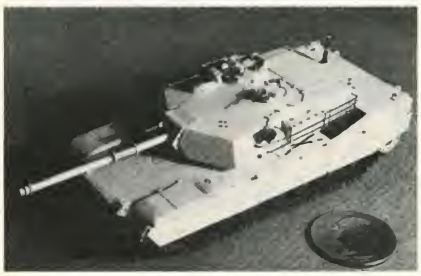
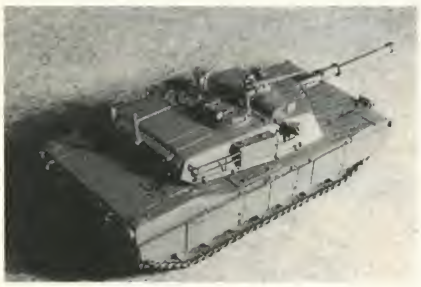


FIG. 9 SCRATCHBUILDING TRACK

FIG. 10. After adding the track, the suspension was painted before the side skirts were attached. Note that the puttied areas have been primed.





FIGS. 11 and 12. The completed model before painting, and after the base coat of Forest Green was applied.

pension are the track guide horns and the guide plate over the rear drive sprocket. The guide horns are "U"-shaped, and I made them using the slice-the-loaf technique. Before closing off the suspension with the track skirt, paint the wheels and track — it will be difficult to reach them with the skirt on.

Detailing — I made the side skirts, fig. 10, by laminating pieces of .015" styrene onto another .015" sheet to make the gaps between the skirt plates. The 105 mm gun was made from aluminum and brass tubing. I made the grillwork over the engine deck and exhausts from photoetched brass model railroad diesel parts.** The smoke grenade launchers on the M1 are an American adaption of a British type, so parts from an Airfix Chieftain are appropriate.

The rest of the details on my M1 were made from stretched sprue, plastic sheet, and plastic strip, fig. 11. One tool I find exceptionally handy is the set of punch dies available from Waldron Products.*** Waldron makes instrument-panel detail for aircraft modelers, and the punch set is designed for cutting holes for the dials. While small-scale armor models don't usually have instrument panels, the Waldron punches are great for making plastic circles in five small sizes.

Paint schemes — XM1 prototypes were painted in MERDC (Mobility Equipment Research and Development Command) four-color schemes, including temperate and winter schemes. Most production M1s I've seen at Ft. Hood and Ft. Knox have been painted in the basic scheme of overall Forest Green, and will eventually be finished in one of the four-color patterns. I finished my model in the "winter verdant" scheme of Forest Green (FS 34079), Field Drab (FS 30118), Sand (FS 30277), and Black (FS 37038).

I started by airbrushing the model basic Forest Green using a mixture of Floquil paint, fig. 12. Next, I added the Field Drab, and finally the highlight colors of Sand and Black, fig. 13. The reference box below lists articles which show the proper pattern for the M1 and explain the new four-color MERDC scheme, but keep in mind that when units in the field apply these patterns the results seldom match the regulation version exactly.

It's also important when building small-scale armor not to match Federal Standard colors exactly, because exact matches will result in a model which looks much too dark. I always use colors somewhat lighter than the Federal Standards to compensate for the scale distortion of color saturation.

Weathering with gouache — Following the basic paint coat, I prepared my M1 for further weathering by applying a thin wash of "grubby-dirt" Polly S. This wash tones down the basic paint finish and "tempers" the surface of the model so I can then work over it with gouache, which does not adhere well to Floquil Colors or plastic.

Gouache, a fine casein-base watercolor available at art stores (I use the Winsor & Newton brand), has a finely ground pigment, can be applied in delicate washes, and can be easily blended and shaded. It takes some getting used to, but gouache is pleasant to work with (and it doesn't clobber your expensive brushes like most hobby paints!). To protect the gouache, spray the model with a clear matte finish such as Testor Dullcote, Floquil Flat Finish, or MicroCoat Flat.

I mount all my models on bases, a practice which protects them by making it possible to pick up and inspect the model by the base and not crush delicate detail or ruin carefully applied matte finishes with sweaty fingers. For this model, I chose a photoetched base instead of the usual scenic groundwork. Good luck on your M1 Abrams! **FSM**

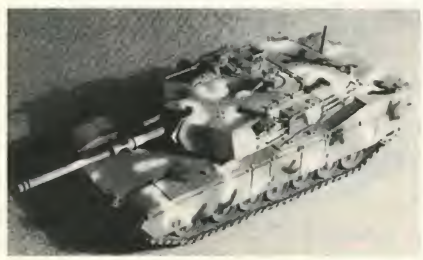


FIG. 13. The M1 after painting the MERDC camouflage scheme, but before weathering with gouache colors.

** Detail Associates, Box 197, Santa Maria, CA 93456; Part No. 229-2703, Cooling Fan Grilles

*** Waldron Model Products, 1358 Stephen Way, San Jose, CA 95129

Meet Steve Zaloga

Born in 1952, Steve Zaloga received his M.A. in history from Columbia University, where he specialized in the armed forces of Eastern Europe. He is a Group Director of defense market research at DMS Inc. in Greenwich, Connecticut, where he works on vehicle and ordnance programs.

Steve is the author of a dozen books and several dozen articles on tank history and development, his latest being *Modern American Armor* (Arms and Armour Press, London, 1982). An avid modeler since college, he has won numerous prizes for his models at national and regional competitions in the U. S. and Canada, and has served as a judge at the national and regional levels.

REFERENCES

- *AFV G-2* Vol. 6, No. 5. includes 1/35 scale plans of the XM1 prototype.
- IPMS *Quarterly* Vol. ll, No. 2. contains a comprehensive article on the four-color MERDC paint schemes, though no details on the M1.
- IPMS *Quarterly* Vol. 16, Nos. 1 and 2 contain a two-part series which includes useful photos of the M1 under construction, a 1/35 scale plan of the XM1 prototype, and color information.

The author extends his thanks for their help in obtaining photos to George Woodard, Major Charlie Parker, and the M1 Program Manager's Office at Army Tank and Automotive Command, and at Ft. Knox.

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"TO A FAIR WIND . . .

Shep Paine's *Nelson Before Copenhagen* diorama required novel solutions to several modeling problems

BY SHEPERD PAINE

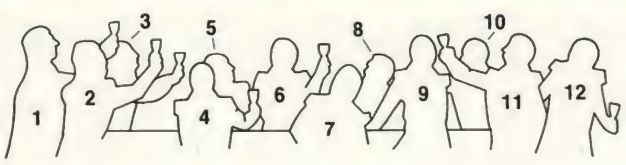
EARLY IN 1801 the British dispatched a naval expedition to the Baltic to destroy the Danish fleet. Although overall command of the expedition was given to Admiral Sir Hyde Parker, Admiral Horatio Nelson, his second in command, was to direct the actual fighting in the decisive battle of the campaign at Copenhagen.

The British fleet entered Copenhagen roads, where the Danish fleet was at anchor, on the evening of April 1 and prepared to do battle the next day. Colonel William Stewart of the Rifle Corps, commander of the expedition's land forces, recalled the occasion: "As soon as the fleet was at anchor, the gallant Nelson sat down to dine with a large party of his comrades in arms. He was in the highest spirits, and drank to a leading wind, and to the success of the following day. Captains Foley, Hardy, Fremantle, Riou, Inman, his Lordship's second-in-command, Admiral Graves, and a few others to whom he was particularly attached, were of this interesting party; from which every man separated with feelings of admiration for their great leader, and with anxious impatience to follow him to the approaching battle."

The fighting the next day was, by Nelson's own admission, some of the hardest of his career. Danish resistance was fierce, and the outcome was in doubt for much of the day. At the height of the struggle a signal from Admiral Parker's flagship calling for immediate withdrawal was brought to Nelson's attention. Feeling victory almost within his grasp, Nelson is said to have held his telescope to his blind right eye, exclaiming "Really, I do not see the signal!" The victory was one of the greatest of his career, but the cost was great: of the "band of brothers" who had dined with him the night before, one was dead and three were badly wounded.

The diorama — I had long wanted to build a diorama portraying the eve of Copenhagen, not only for the high drama and historical significance of a before-the-battle dinner, but also for the visual elegance of the occasion, which would include soft candlelight reflecting off polished silver service and the gold braid of the officers' uniforms, and the warm glow of the wine in their glasses.

Research is always the first step, and in this project there were three problem areas: the occasion itself, standard practices in dining at sea, and the design and decor of the cabin. The occasion presented no great mystery, since Stewart's account lists most of the officers present, and portraits of most could be found.



1 Captain Thomas Foley
HMS *Elephant*

2 Lt. Col. William Stewart

3 Officer of Marines

4 Captain Henry Inman
HMS *Desiree*

5 Captain Sir Thomas Thompson
HMS *Bellona*

6 Vice Admiral Lord Nelson

7 Captain Thomas Bertie
HMS *Ardent*

8 Captain Thomas Fremantle
HMS *Ganges*

9 Lt. Col. William Hutchinson
HM 49th Regiment of Foot

10 Captain Thomas Hardy
HMS *St. George*

11 Captain Edward Riou
HMS *Amazon*

12 Rear Admiral Thomas Graves

A dozen brothers in arms dined together in HMS Elephant on April 1, 1801, the eve of the Battle of Copenhagen (the diagram on page 18 lists the participants). Atmosphere is crucial in this 1/18 scale diorama; the mood created by the lighting, figures, and setting is just as important as the action. Candlelight, the rich tones of varnished wood, and the soft sheen of polished silver combine to produce a mood of warmth and camaraderie.

AND VICTORY!"

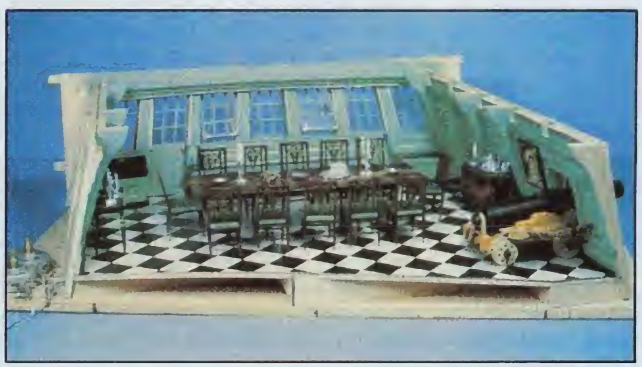
Shipboard dining habits presented a thornier problem. John Masefield's classic *Sea Life in Nelson's Time* includes many details of shipboard life, and since most officers came from the landed gentry and tended to take country habits to sea, I drew additional details from Girouard's *Life in the English Country House*.

Deciding on the pose — I chose to model the scene with a toast in progress. Toasts were normally drunk after the meal was completed but before wine and cheese were served, which meant that the tablecloth, silver, and china would have been cleared away, and I could avoid dealing with the practical problems of how the meal was served.

The toast caused one design problem, though. Naval officers of the time always stood for the Royal toast (King William IV, who had served in the Navy and had experienced firsthand the discomforts of standing under a low overhead, did not grant the naval privilege of drinking the toast seated until the 1830s). If I showed the officers seated (or getting ready to rise), much of the drama of the moment would be lost; yet if I had them standing, the diminutive Nelson (who stood only 5 feet 5 inches tall) would be lost in the crowd. The solution was to pose the figures in the process of rising, some standing, some still seated, and some halfway between, permitting an interesting arrangement while keeping the focus of attention on Nelson.

While the design of the cabin would pose the greatest construction challenge, it turned out to be a research problem as well. Just before the battle, Nelson transferred his flag to the 74-gun *Elephant* because of its shallower draft. If the dinner had taken place on board a normal flagship such as HMS *Victory*, research would have been easy, since the *Victory* survives to this day at Portsmouth. On a ship of that size, the Admiral would have had his own dining cabin, but on the smaller *Elephant* dinner would have been served in the captain's day cabin, and no detailed plans of this part of the *Elephant* survive. I did, however, have access to beautifully detailed plans for a similar French ship in Jean Boudriot's *Vaisseau de 74 Canons*, and by comparing those plans with British practice as revealed by HMS *Victory*, I came up with a satisfactory composite.

Planning — My next step was to draw detailed full-size plans for the diorama. I usually do this, because full-size plans give me the first tangible indication of the size and shape of the finished product, and allow me to see how all the elements of the scene will fit together. The scale I usually



This view of the right and rear cabin walls before painting shows that the diorama is mostly wood. The photo also shows how the cabin is angled to the viewing window. The green patches are putty used to patch minor flaws in the paneling.

With the figures missing and the light much brighter than for normal viewing, it's easier to appreciate the fine curved lines of the ship, the graceful sweep of the stern windows, and the quiet elegance of the paneled cabin and its furnishings.

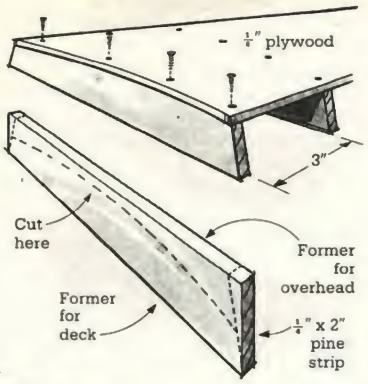


FIG. 1
DECK AND OVERHEAD CONSTRUCTION

choose for historical dioramas of this kind is 1/18, large enough to provide a good-sized viewing area, yet small enough to remain portable.

Unlike most dioramas, this one had to be planned from the outside in, since the dimensions of the cabin were known and set, and the locations of the table, chairs, and figures would have to be adjusted to fit. Early on I realized that the axis of the ship would have to be angled in the box, both to give spontaneity to the scene and, more important, to ensure a clear view of Nelson as the central figure.

The biggest planning problem was the construction of the cabin itself, with its convex deck and matching overhead, elegant paneling, and broad sweep of windows at the back. The cabin also had to be designed so that it could be disassembled for construction and repairs, yet fit together without visible joints.

Constructing the deck and overhead — I made a cardboard template for the curve of the deck and overhead during planning and used this to lay out formers for the deck and overhead. These were cut from ¼" x 2" pine, the top piece being used for the overhead, the bottom for the deck, fig 1.

I assembled the deck by screwing a sheet of ⅛" model aircraft plywood to the formers. This resulted in a gracefully curved deck. Since the plywood was only a subflooring which would be covered later, I drew pencil lines on it, drilled it full of holes, and generally used it to experiment with figure positions, furniture locations, and so forth. The final floor was to be heavy cardboard painted in a checkerboard pattern to simulate canvas flooring.

The construction of the overhead was similar to the floor, except that I carefully located the formers so the ceiling beams would cover the screws. Curving the ¾" square beams was a problem, because soaking and bending them (the way I'd planned to do it) didn't work. The solution was to make each beam by laminating three ¼" x ¾" strips, clamping them to the curved overhead while the glue dried, fig. 2. I made the decorative molding on the edge of each beam using the same method used to form the edges of the table, fig. 5. After sanding and finishing, I glued the beams to the overhead.

Constructing the side walls and assembling the cabin — I cut the walls from ¼" model aircraft plywood and immediately test fitted them in the cabin. (Aside from ensuring a good fit, seeing something actually go together is a great morale booster after all the research and planning!) I secured the sides to the ends of the deck formers and overhead beams with screws so they could be repeatedly assembled and taken apart as construction progressed.

The ¼" basswood ship's "knees" (the curved braces securing the beams to the side of the ship) were installed next, taking care that they fit properly against the overhead beams. I paneled the walls with basswood strips, working with the overhead in place and installing strips from top to bottom to ensure a good fit. The thin gold accents on each panel were not added until after the walls were painted.

The back wall — The back wall, or stern bulkhead, was challenging. The wall itself is curved, and the windows and architectural details on it are curved to match the deck and overhead, a situation complicated even further by the backward slant of the wall and the inward slant of the side walls. In short, everything in the assembly is either curved or angled, or both — there isn't a single right angle to be found anywhere!

Making the back wall turned out to be easier than I had thought. The first step was to cut the wall from ⅛" plywood, cut a curved opening for the window, and glue the wall to curved formers similar to those used for the deck and overhead. This was then test fitted against the rest of the cabin and holes piloted for screws.

After checking the fit once again, I removed the back wall and added heavy upright beams (actually, the stern timbers of the ship) between the windows, fig. 3. To conform to the inward-sloping side walls, these timbers must radiate like the spokes of a wheel; each had to be slightly narrower at the top than at the bottom, as well as at a slightly different angle, fig. 4.

Next, I glued shelves between the stern timbers at top and bottom to give the windows the proper depth. The odd angles involved, figs. 5 and 6, meant that each piece had to be measured, cut, test fit, and cut again until the fit was right — a long and tedious process, but the only way to ensure a neat job.

To achieve the proper molding configuration, 42 pieces were required for each window, fig. 7. No two windows, and hence no two window pieces, were

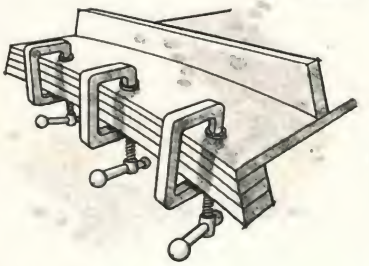


FIG. 2

Curved overhead beams are made by gluing three ¼" x ¾" strips together, using the curved overhead as a fixture.

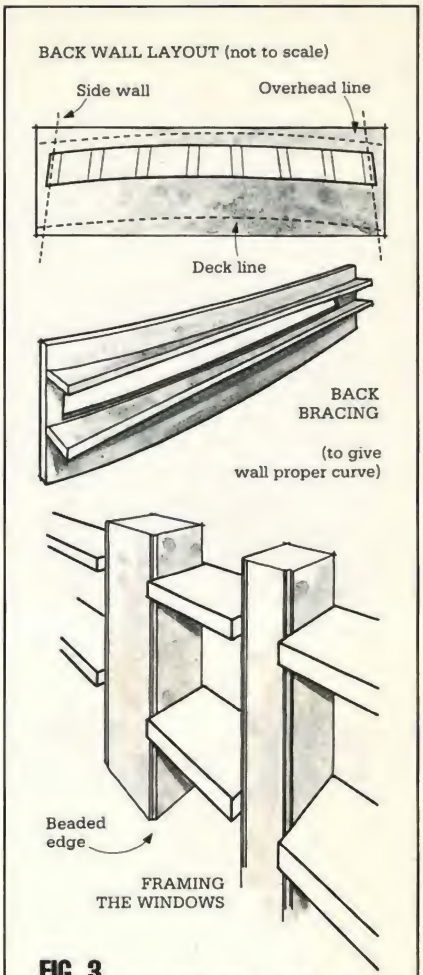
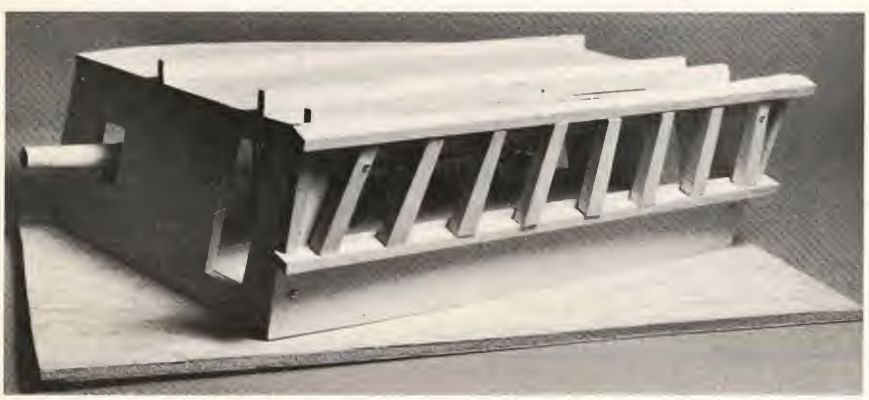


FIG. 3
BACK WALL CONSTRUCTION

FIG. 4. Here the back wall has been test fitted for the first time. Note how the uprights between the windows radiate outward. The table and chairs have been installed to check how they relate to the remaining space and the viewing angle.



FIGS. 5 and 6. Front and rear views of the scene, showing the overhead installed and the heavy uprights behind the stern bulkhead. Without a doubt the greatest challenge in constructing this scene is that there is scarcely a right angle in it anywhere.

exactly alike. The glass is clear styrene, screwed to the back of the uprights to hold it flush against the moldings. Actually, making the windows turned out to be more tedious than difficult, and spreading the task out over several weeks helped preserve my sanity!

The cabin is crowded, so I opened two of the windows for ventilation. I built these separately over a paper template, then glued them in place. The cords that suspend the open windows pass through holes in the overhead and are tied off on the top of the scene.

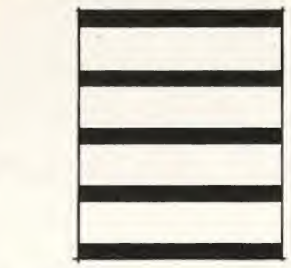
To ensure a perfect fit, I installed the basswood benches while the back wall was attached to the deck. The benches doubled as wine lockers, so I left one open to illustrate this feature.

Painting the cabin — Today, the officers' quarters on HMS *Victory* are white, but the most common color in 1801 was pale sea green. Because I had sealed all the wood parts with lacquer and de-fuzzed them with steel wool before assembly, no additional preparation for painting was required. I airbrushed the walls with several coats of Floquil paint, then accented the paneling by shading it with powdered pastel chalk. To fix the chalk, I added a final coat of semigloss varnish. The overhead was painted white. I finished the walls by adding narrow gold molding strips (1/32" square basswood, painted before installation).

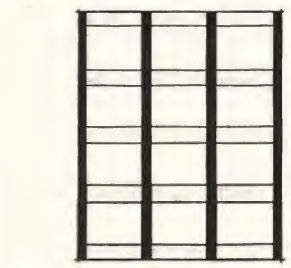
Furniture and furnishings — This diorama was my first foray into miniature furniture construction, at least elegant drawing room pieces of the kind that would be found in a captain's or admiral's quarters. I started with the tables. The tops were simple enough; the only problems would be the ornate legs and decorative moldings on the edges.

I turned the table legs on a Dremel modeler's lathe — although I got better at it with practice, no two are exactly alike, but the scene was to be so

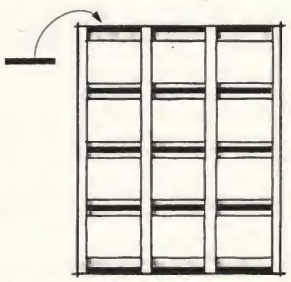
FIG. 7 WINDOW CONSTRUCTION



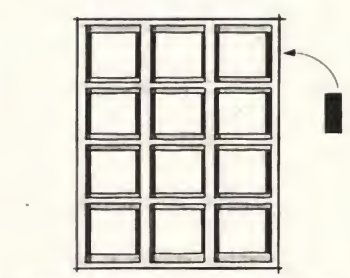
1. Glue in 5 wide horizontal strips.



2. Add 4 narrow vertical strips.



3. Next, 15 narrow strips are glued to front of wide strips in STEP 1



4. Final step is to add 16 wide strips, behind narrow strips in STEP 2

Each of the seven windows contains 42 separate pieces, each of which must be cut and fit individually. Two sizes of stripwood are used: 1/16" x 1/32" for the wide strips, 1/8" x 1/32" for the narrow ones.

The corners of dioramas are often overlooked. Here, on the right side of the scene, we find the ship's cannon and a large stack of dirty dishes. I added the dishes after wondering where such things might be put when the table was cleared; in the crowded captain's quarters, this seemed the most logical spot. The chest is typical of those sold by dockside purveyors of captain's silver in this era.

Here, again on the right, a seaman temporarily assigned to the captain's cabin for the occasion politely refills a glass for Admiral Graves.

cluttered with chairs and figures that this would never be noticed. The decorative edging clearly called for a router, but the Dremel router is too big to handle a job this delicate.

My solution was to devise a miniature router using my Dremel drill press, fig. 8. The key item is the small homemade router bit built from brass sheet and tube. The soldered joint is strong enough for a one-use tool like this one, and the brass cutter blade held its edge long enough to cut the edges on the maple tabletop. I used maple, incidentally, because it yields a crisp edge under the router.

I made a brass pattern and cast the chairs in white metal, but I could have just as well cast them in polyester resin, following the method described in my book, HOW TO BUILD DIORAMAS. The chairs could also be made individually, but casting is preferable because it ensures all 12 chairs will be identical. The complicated decorative scrollwork in the chair back came from a 1/12 scale dollhouse miniature rug beater!

The samovars, plates, trays, and tea sets in the scene are small miniature room pieces carefully selected so the minor discrepancy between their nominal 1/12 scale and the rest of the 1/18 scale scene is not apparent. Because the gleam of silver in the candlelight is crucial in creating the atmosphere of the scene, I painted the pieces with Nybco* aerosol chrome paint, which yields the best shiny metallic finish I've ever seen.

The cannon is a significant item in this scene, both for its aesthetic effect and as a grim reminder of the battle to come. For all the superficial elegance of their quarters, naval officers never forgot that theirs were fighting ships, and guns were crowded into every space available. When the ship cleared for action, the entire cabin — walls, furniture, and decorations — was dismantled and stowed, leaving an open gun deck from stem to stern, not only to facilitate working the guns, but also to reduce the danger of flying splinters, the principal cause of casualties. The guns in the captain's cabin were no different from the others, although they probably were subjected to a little more spit-and-polish.

The gun barrel was turned from wood on my Dremel lathe, and the carriage was built of ¼" basswood. The trunnion caps (which secure the gun to the carriage) are styrene, while various metal fittings are thick wire solder. The rope breechings and training tackles are nylon twine dyed in coffee (the fine fibers and soft sheen of nylon are more realistic than cotton twine). Construction of the blocks (nine are required) is easy; the secret is to build all nine in a long strip, cut them apart, then trim and sand to final shape.

Building the fitted window in the gun port called for some extra thought. The hole through which the gun protrudes is neither centered nor round, and the window is perpendicular to the sill, not flush with the ship's side. Here the key was to cut cardstock templates, modifying them until I made one that fit perfectly, then using it as a

*New York Bronze Powder Co., Elizabeth, NJ 07201; Bensenville, IL 60106; Norwalk, CA 90650.

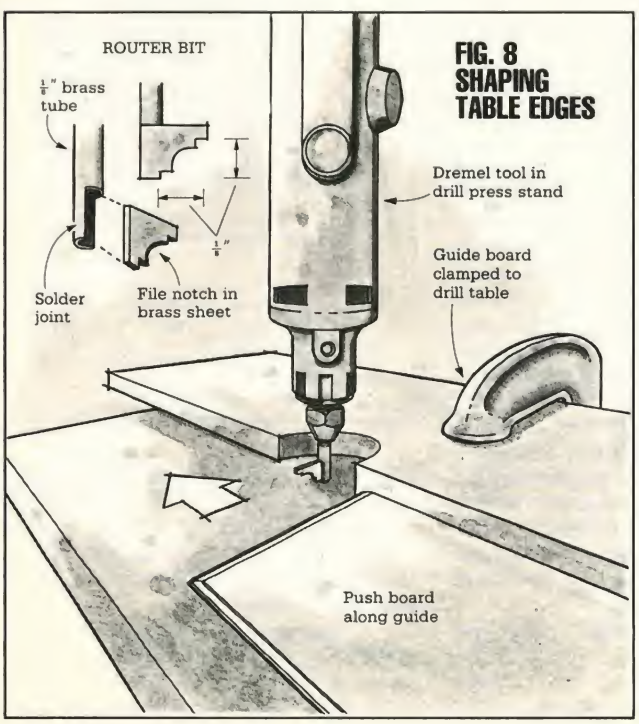


FIG. 8 SHAPING TABLE EDGES

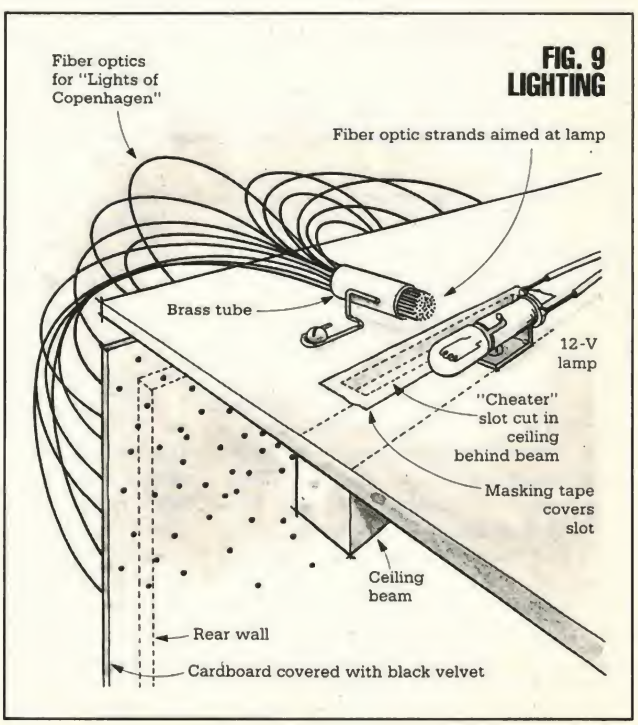


FIG. 9 LIGHTING

pattern to make a clear styrene pane.

The final item worth mentioning is Lady Hamilton's portrait. Nelson always took the portrait to sea with him, and to this day it hangs in his cabin on HMS *Victory*. It seems likely that this would have been one of the few personal items he would have transferred for his short stay on *Elephant*. I had a 35 mm slide of the painting, and a contact print yielded a miniature only slightly larger than scale size. I framed the portrait with Plastruct and glazed it with clear styrene.

Figures — All figures in the scene were built from scratch, and there isn't room to adequately describe their construction in this article. Still, a brief note about them is in order, since they are the most important elements in the scene. The first step is to sculpt the "common denominator" parts in epoxy putty and cast them in white metal. These are parts common to most of the figures: torsos with buttoned vests, seated legs with breeches and knee buckles, arms in tight sleeves with buttoned cuffs, and buckled shoes.

The white metal parts were then assembled and posed, the gaps between them filled, and final details such as collars, epaulets, and coattails added.

The greatest challenge modeling the figures was that each had to be a reasonable likeness of the man it represents, and each had to be smiling, an expression that is difficult to capture in miniature. To complicate matters, sitting for a portrait in the early nineteenth century was serious business, and even the slightest hint of a smile was unpardonable frivolity.

The smile was a particularly vexing problem with Nelson — he is the central character and the likeness would have to be good, but I could find no illustrations that showed him smiling, not even a wry, confident smile. I finally had to work from photos of the wax effigy of Nelson in Westminster Abbey (it was done from life; Lady Hamilton called it an excellent likeness), superimposing a smile on it. After the piece was finished I was gratified when noted Nelson authority Dudley Pope (who helped with my research) called the expression "perfect."

Lighting — The final challenge in modeling a mood piece is lighting. The real occasion was lit by candlelight, but based on my previous experience with candlelight model scenes, supplementary lighting would be required.

The candle flames are Pacific Fast Mail micro-mini model railroad bulbs. To work off the diorama's 12-volt system the 1.8-volt bulbs must be wired in series with a 100-ohm resistor and a 25-ohm potentiometer (dimmer pot).

Adding supplementary light was complicated by the low overhead and the depth of the cabin. The solution was to cut narrow slots in the overhead behind the beams, fig. 9. Bulbs were mounted on top of the ceiling and the slots were covered with masking tape to diffuse the light and give it a warm yellow glow. Four bulbs were used — two directly over the table, one in front of it, and one just behind.

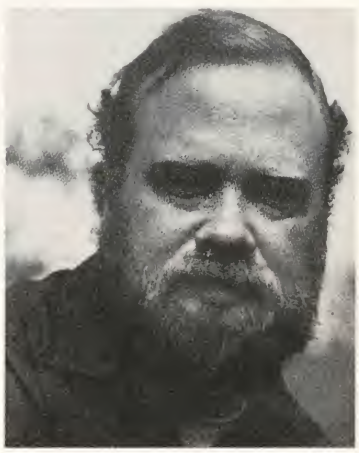
The final lighting touch was to add the lights of Copenhagen, which would be visible through the stern windows, fig. 6. I mounted black velvet on cardboard, drilled holes through both, and poked thin fiber optics through each hole, leaving only the tip visible on the velvet side. All the opposite ends of the fiber optic strands were gathered on top of the overhead and aimed at one of the bulbs, which makes the lower ends glow realistically.

When a project of this scope is finally completed, my feeling is often less of accomplishment than of relief. Still, as I look back a year after its completion, "To A Fair Wind . . . and Victory!" was a joy to work on from beginning to end, and a favorite among all the dioramas I have built. **FSM**

REFERENCES

- Boudriot, Jean, *Le Vaisseau de 74 Canons*, Editions des 4 Seigneurs, Grenoble, 1976.
- Bugler, Anthony, *HMS Victory: Building, Restoration and Repair*, H. M. Stationer, London, 1967.
- Girouard, Mark, *Life in the English Country House*, Yale University Press, New Haven, 1978.
- Longridge, Nepean, *The Anatomy of Nelson's Ships*, M. A. P., London, 1972.
- Masefield, John, *Sea Life in Nelson's Time*, U. S. Naval Institute Press, Annapolis, 1973.
- Pope, Dudley, *The Great Gamble; Nelson at Copenhagen*, Simon and Schuster, New York, 1972.
- Pope, Dudley, *Life in Nelson's Navy*, U. S. Naval Institute Press, Annapolis, 1981.

With 14 figures, 12 chairs, the table, and a cannon, the completed diorama is fairly crowded. But the center of attention is still the toast: "To a fair wind . . . and victory!"



Meet Shep Paine

Sheperd Paine is probably best known for the stunning dioramas he created for Monogram Models to promote their armor and aircraft kits, and for his recent book, HOW TO BUILD DIORAMAS (Kalmbach Publishing Co., Milwaukee, 1980). A full-time modeler, his widespread reputation also stems from his military miniatures and boxed dioramas, which have won prestigious awards throughout the United States, Canada, and Europe.

In 1972, Shep was elected the first Grand Master of the Miniature Figure Collectors of America. He is a member and Fellow of the Company of Military Historians. His output of original pieces is small, and his figures and boxed dioramas are eagerly sought by collectors (the diorama featured in this article is now in the collection of artist Andrew Wyeth). In addition to occasional coverage in modeling magazines here and abroad, Shep's work has been featured in national publications such as *Forbes* and *Sports Illustrated*. His figures and boxed scenes have been the subject of one-man exhibitions at the Brandywine River Museum in Chadds Ford, Pennsylvania and the Museum of Science and Natural History in St. Louis, Missouri.

Shep enjoys sharing his ideas and techniques with other modelers, and in addition to writing articles and books, he has conducted "how-to" classes in modeling. Shep is 35, unmarried, and makes Chicago, Illinois his home base.

Historical Studies Section, Australian Department of Defence

A Royal Australian Navy Sea Fury lands on HMAS Sydney. Date unknown; probably early 1950s. Note the extreme extension of the wing flaps and the arrester hook that seems to be hunting for the deck cables.

Research data: the HAWKER SEA FURY

Finding accurate information on a rare bird can be almost as much fun as modeling

BY KEN SOMMERFIELD

I HAVE THREE HOBBIES: building 1/72 and 1/48 scale aircraft, visiting air shows and aviation museums, and airbrushing paintings of aircraft. I suppose that all three are ultimately based upon my curiosity about individual airplanes — I always want to know what sets one plane apart from all others, even others of the same design.

I live in a small town in north-central Illinois, so I can't visit the Smithsonian Institution, or the National Archives, or the Royal War Museum to conduct research. I suspect that many of you are in a similar situation. In this article, I'll explain how I obtain accurate research data inexpensively. I'll use the Hawker Sea Fury F. B. Mk. 11 as an example, but my methods apply to all types of aircraft.

About the Sea Fury — I'm fascinated by the Sea Fury because it exemplifies the ultimate development of piston engine fighters. This plane is one of those post-World War II fighters that had the misfortune of being born at a time when jet power was taking over, and as a result it has been relegated to a kind of historical back room. In spite of this, the Sea Fury is a beautiful plane that did yeoman work during the infancy of jet fighters. A lucky few escaped the scrap torch and have been lovingly restored by private owners who often fly them to the Experimental Aircraft Association's annual exhibition at Oshkosh, Wisconsin.

Hawker Aircraft, Ltd., Kingston-on-Thames, Surrey, based the Sea Fury's design on its highly successful Tempest of World War II tank-busting fame. The Sea Fury served with the Royal Navy, the Royal Australian Navy, the Royal Canadian Navy, and the Royal Netherlands Navy. Land-based Sea Furies were flown by the Royal Iraqi Air Force, the Royal Pakistani Air Force, and several others. The Dutch planes (Sea Fury F. B. Mk. 51) were assembled by Fokker, the rest were built at the Hawker factory at Kingston-on-Thames. The principal versions of the Sea Fury were:

- Sea Fury Mk. 10: The first production model, 50 made, all except the first prototype were powered by a 2550-horsepower Bristol Centaurus 18 engine. This 18-cylinder two-row radial engine turned a huge five-bladed constant-speed metal propeller that was 12′ 9″ in diameter.
- Sea Fury F. B. Mk. 11: Similar to the Mk. 10, but incorporating all of the 50 minor internal modifications made successively during the production of the Mk. 10.
- Sea Fury T. Mk. 20: A two-seat trainer version of the Mk. 11.
- Sea Fury F. B. Mk. 51: Similar to the

Collect-Air Photos

Contrails, created by the rapid movement of the propeller tips through humid air, spiral behind a Royal Navy Sea Fury.

Photos of such details as wheels and brakes, which frequently differ from one plane to the next, ensure your model will be absolutely correct.

(Above) A Sea Fury streaks by during an aerobatic demonstration at the EAA's 1976 Oshkosh exhibition. A second seat has been installed in this plane. (Right) The canopy on a Mk. 20. Note the framed forward section, the fixed center section, and the tracks on which the forward and rear sections slide.

Mk. 11, but with Dutch instrument markings and other minor changes.

Finding free or inexpensive data — Other data about the Mk. 11 appears in the table. How did I obtain this information? Easy. I just walked to my public library and dug out the 1954-55 edition of *Jane's All the World's Aircraft*. Even small libraries usually have several copies of *Jane's*, so it's often your best and easiest reference.

A quick search through library card catalogs and *Books in Print* turned up a title that sounded promising: *British Naval Aircraft Since 1912* by Owen Thetford (Putnam & Co., London, 1962). This book provided additional data about the Sea Fury and included good three-view drawings.

If you can find a copy, Paul Cardwell Jr.'s *Index to Model Periodicals, 1971 through 1975* (Scarecrow Press, Metuchen, NJ, 1977), is valuable, because it indexes articles on such subjects as color schemes and kit conversions from 27 modeling magazines. Back issues of *Air Classics* and *Air Classics Quarterly Review* magazines are also worth consulting.

A quick and easy source of photos is Leo J. Kohn's Collect-Air Photos, P. O. Box 14234, Milwaukee, WI 53214. Leo sells inexpensive packages of photos of aircraft and has thousands of photos in stock. While we're on that subject, the leading directory of photo collections in the U. S. and Canada is *Picture Sources*, edited by Ann Novotny (Special Library Association, 235 Park Avenue South, New York, NY 10003). The most recent edition is 1975; this is now out of print, but an updated edition is being prepared. The book lists more than 1000 collections by subject, geographically, and alphabetically. It contains information on the type and size of each collection, provides the address, and gives the name of the curator.

You should also know about the National Association of Scale Aeromodelers, a club for model aircraft enthusiasts, which publishes a *Scale Data Source List* describing organizations that have been helpful to modelbuilders. Write John Preston, 7012 Elvira Court, Falls Church, VA 22042, for membership information.

In general, I've found that small firms and privately owned museums provide faster service than government agencies. I'm not knocking anybody here; it's just that places like the Library of Congress and the Smithsonian are overwhelmed by requests for information.

Journey to Oshkosh — I now had plenty of information about Sea Furies, but I like to base my paintings, as you probably do your models, on a particular aircraft at a particular time. So, off I went to Oshkosh for the EAA show. I was treated to the sight of a Sea Fury performing low-level, high-speed aerobatics complete with smoke trails. Believe me, the turbulent wake created by that awesome five-bladed prop is impressive.

I then photographed the Sea Fury I'd chosen as the subject of my painting. I always take several photos of the entire aircraft and then concentrate on close-up photos of details such as control surfaces, landing gear, engine cowling, and insignia and other markings. I sometimes use a yardstick to provide a scale reference right in the photo.

You don't need a fancy camera for these photos; even an Instamatic works well. Do shoot two or three times as many photos as you think you'll need: This might be your only chance to see the airplane, and you don't want to be halfway through a model only to find that you don't have a picture of, say, the arrester hook. I never could have painted the folding wing mechanism if I hadn't taken many photos. Note also the unusual position of the ailerons when the wing is folded.

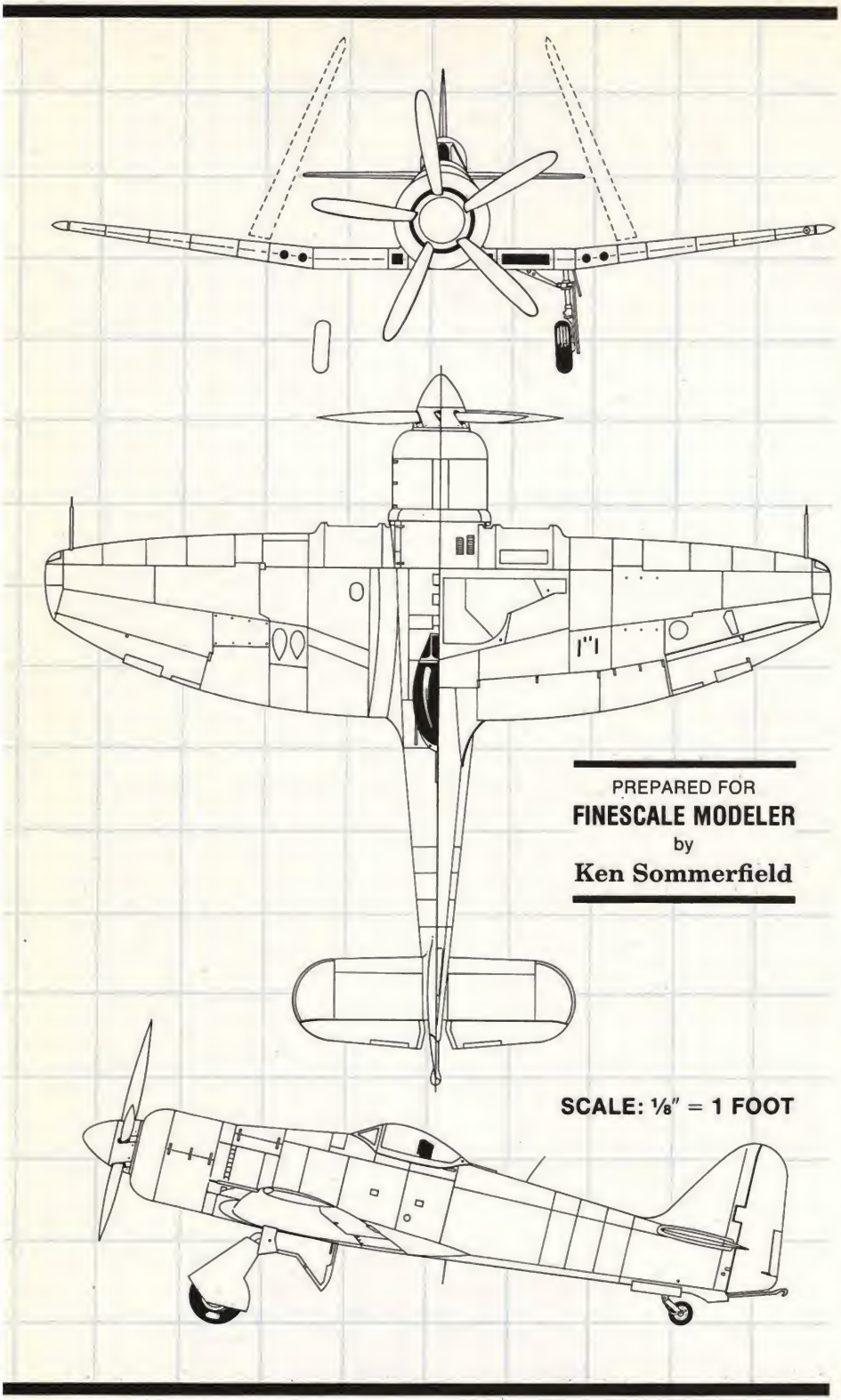
In many cases, you'll be able to find good planes to model in your own backyard. For example, the EAA sponsors numerous regional fly-ins which attract many historic aircraft, and there are air museums in almost every state.

(Above) Features like the fairing below the exhaust pipes in the cowling are hard to visualize in a drawing, but become clear in a photo. (Right) This plane is the subject of my painting.

Check for aviation-related activities in the calendar of events included in most pilot's magazines. Open houses at military bases offer still more opportunities.

The plane in my painting — Be certain to record the airplane's registration number (the "N number"). Consult the *United States Civil Aircraft Register* (or just call any FAA office) to obtain the name and address of the aircraft owner. A short, polite letter to him will probably produce a long, enthusiastic description of the aircraft and its history — after all, these pilots are hobbyists too, they just play with bigger toys!

My painting shows Sea Fury Mk. 11, N260X, as it appeared at Oshkosh in August 1980. The owner in San Jose, California, told me that his plane (serial number 41H636334) was built in 1951 at Kingston-on-Thames and was approximately the 600th in a total of 864 Sea Furies produced. The plane, squadron number 105, served with the WH587 Squadron, Royal Australian Navy, but was never based on a carrier (this explains the absence of the letter K on the vertical stabilizer). The Australians added the kangaroo inside the



HAWKER SEA FURY F. B. MK. 11

Manufacturer:	Hawker Aircraft, Ltd., Kingston-on-Thames, Surrey
Power plant:	One 2,550 horsepower Bristol Centaurus two-row radial engine
Dimensions:	Wingspan – 38′ 4 ¾″ (16′ 1″ folded) Length – 34′ 8″ Height – 15′ 10 ½″ Wing area – 280 square feet
Weights:	Empty – 9,240 pounds Loaded – 12,500 pounds
Performance:	Speed – 460 mph at 18,000 feet, 415 mph at 30,000 feet Rate of climb – 10.8 min. to 30,000 feet Range – 700 miles at 30,000 feet, or 1,040 miles with two 90-gallon drop tanks. Service ceiling – 35,800 feet
Armament:	4 fixed 20 mm cannons in wing; 12 60-pound rockets or 2 1,000-pound bombs below the wing. Other ordnance loads possible.

roundels and painted roundels on the upper and lower wing surfaces.

The plane flew about 100 hours from 1951 to 1954, was put into storage for three years, was restored in 1956 or 1957, and flew another 58 hours. Total military time was 168 hours. It was sold to a scrap dealer in 1961, but was saved by a private buyer. Since then the plane has passed through several owners in such places as New Mexico and Oregon. Quite a career.

The canopy is stock, but the lower portion of the vertical stabilizer has been slightly altered, the arrester hook has been removed, and the wing cannon ports have been filled in. The armor plating behind the pilot's seat has been removed, as have all wing ordnance attachment points. These minor modifications reduce weight and aerodynamic drag.

The owner says that the present markings are exactly the same as they were in 1954 while the plane was in RAN service. The drop tanks are a nonstandard red; the owner plans to change them to the standard fuselage colors; the yellow spinner will become standard bright red. All upper surfaces are Dark Sea Gray, the lower surfaces and fuselage sides are Sky (also called Duck Egg Green).

When mixing colors for my painting, I consulted a copy of *British Aviation Colours of World War Two.* This book was prepared by the Royal Air Force Museum and contains 32 paint chips. It's sold in the U. S. by Hippocrene Books, Inc., 171 Madison Avenue, New York, NY 10016.

Modeling the Sea Fury — At one time Frog made a 1/72 scale kit of the Sea Fury; you may be able to find a kit at swap meets. If not, start with a 1/72 scale Tempest kit (Heller No. 159 or AMT No. 7115) and make extensive modifications. You'll probably scratchbuild most of the model, using the kit parts for details. If you want a larger model, start with Monogram's 1/48 scale Hawker Typhoon (No. 5303).

Of course, you'll need drawings that show the Sea Fury's fuselage stations (cross sections of the body) and the airfoils. These are available in a set of Sea Fury scale drawings by Willis Nye. A set of four large sheets is available from *Model Airplane News,* 837 Post Road, Darien, CT 06820, for $9.50, which includes postage and handling. If you want rolled drawings, add $1.00.

I thoroughly enjoyed researching the Sea Fury. I learned much from easily available printed sources and had a lot of fun photographing the plane and reading the owner's description of its past. I spent little money and added several hundred photos to my growing collection of research photos. In fact, I I heartily recommend you give it a try on your favorite aircraft. **FSM**

FINESCALE MODELER: A. L. Schmidt

Vacuum-form kits take longer to assemble than injection-molded models, but if you want to model a plane like the Chance Vought F7U-3M Cutlass, they are almost your only alternative to scratch-building.

Building your first vacuum-form kit

A fighter of the '50s: the Chance Vought F7U-3M Cutlass

BY E. RICHARD STASZAK

IN THIS ARTICLE, I'll take you step-by-step through the construction of a typical vacuum-form model, and I'll concentrate on the assembly techniques you must master to become a proficient vacuum-form modeler.

Why vacuum-form? — In vacuum-forming, a heated sheet of plastic is laid over a male mold which rests upon a perforated metal plate. A vacuum is applied under the sheet of plastic, drawing the plastic into the shape of the male mold. The vacuum-forming technique is widely used in manufacturing signs and packaging materials.

Most commercial plastic kits are made by injection molding, in which molten plastic is pumped into hollow steel molds and allowed to solidify. Many injection-molded kits are beautifully designed and assemble easily, so why bother with vacuum-forming? In a word: money. Tooling expenses for even a simple 1/72 scale injection-molded aircraft kit routinely exceed $100,000. Consequently, injection molding is feasible only if the manufacturer expects to sell thousands and thousands of kits — there's no other way he can earn back those tooling costs.

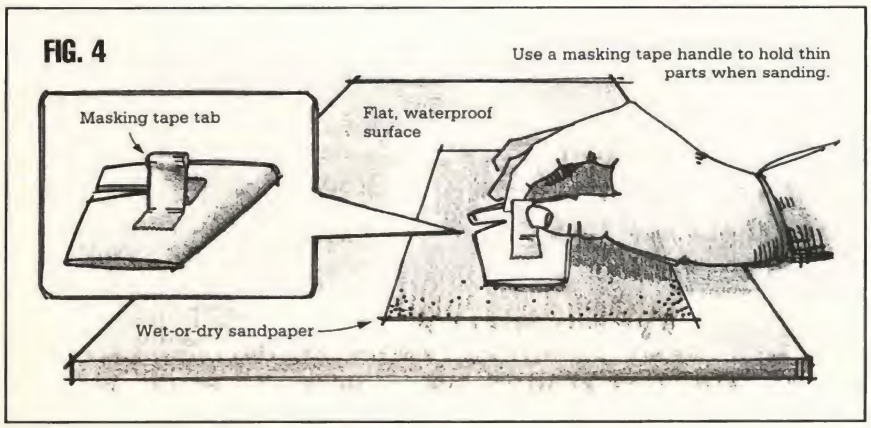
The male molds for vacuum-forming can be made of wood, thermosetting plastic, or other cheap materials, and vacuum-forming machines are relatively inexpensive. Most vacuum-form kits are manufactured by "basement operators," men who are hobbyists first, part-time businessmen second. The subjects are usually rare or exotic aircraft that would never be profitable if injection molded. So, if you want to build a model of a rare or exotic aircraft, your choice is often to scratch-build or to build from a vacuum-form kit.

Why the Chance Vought F7U-3M? — The Rareplanes 1/72 scale kit of the F7U-3 Cutlass is a good choice for your first vacuum-form model because it's an excellent kit by an important vacuum-form manufacturer, because it's easy to assemble (by vacuum-form standards), and because the Cutlass is an interesting modeling subject.

Chance Vought (now Vought Corporation) delivered 307 F7s to the U. S. Navy between 1950 and 1955. There were six actual or proposed versions of the F7; I chose to model the F7U-3M. Ninety-eight of the "3Ms" were manufactured; these were armed with up to four Sparrow I air-to-air missiles.

FIG. 1. Using the kit instructions and drawings as a guide, your job is to build a model from the three sheets of white styrene and the clear plastic canopy included with the Rareplanes kit.

FIGS. 2 and 3. Score the thick plastic with a hobby knife, then flex the sheet to free the parts. Where the plastic is thin, cut all the way through.



In addition to the Rareplanes plans, I relied upon articles about the Cutlass by Arthur Schoeni in *Aeroplane Monthly* (January 1975) and *Air Classics* (June, July, and August 1976). Art Schoeni, now retired, was director of public relations for Chance Vought for many years. His successor, Mike Hatfield, of Vought Corporation (P. O. Box 225907, Dallas, Texas 75265), also provided photos, drawings, and data sheets. I'm told that four restored Cutlasses survive; one each at NAS Olathe, Kansas; NAS Willow Grove, Pennsylvania; Griffith Park, Los Angeles, California; and in the collection of Walter Soplata, Newbury, Ohio.

Kit components and instructions — The canopy is made of clear plastic; all other parts are on three sheets of white plastic, fig. 1.

The reverse side of the packaging sheet contains a picture of the completed model and detailed assembly instructions. The instructions include an exploded-view drawing of the entire model. Several smaller sketches show such features as the intake interior, wing spars, and landing gear. Rareplanes also provides painting and detailing information for two versions of the F7U, and a bibliography.

Preparing the parts — Leave a ½" border of plastic around each part as you remove it from the sheet. Score thick plastic sheets with a hobby knife, then flex the sheet to free the part, figs. 2 and 3. Cut all the way through thin plastic. Because of the vacuum-forming process, all parts are oversize by the thickness of the plastic. Remove unwanted plastic and bring the parts to correct size by sanding them with wet-or-dry sandpaper. Place a sheet of 220-grit sandpaper on a flat, waterproof surface such as a piece of glass and rub the piece on the sandpaper. Move the piece in a circular motion to ensure all sides are sanded evenly, and sprinkle water on the sandpaper as a lubricant. Sand all pieces until the excess plastic is very thin, then remove the last bit of excess with a hobby knife.

When working with thin sheets such as wings or landing gear doors, make a masking tape tab to serve as a handle, fig. 4. Work slowly, and keep at it until all parts are the right size and mating parts align perfectly.

Engine assemblies — Open the engine intake area and the tail pipe on both fuselage halves with a hobby knife or hot knife and smooth the edges with files and No. 400 wet-or-dry sandpaper. An "intake blanking plate" fits inside the intake area. The plans show a full-size pattern for this part, which is cut from scrap plastic. Make the pattern from thin cardboard (file cards are good) and trim the pattern until it fits perfectly. Then cut the plastic part, but do not glue it in place at this time. Prepare a cardboard pattern for the bulkhead that prevents light from shining through the engine, trim the pattern, and cut the bulkhead from scrap plastic, fig. 5.

If you want a superdetailed model,

Both photos, Vought Corporation

(Left and above) These 1954 photos show the F7U-3M in service with the U. S. Navy. Developed in the late '40s, the Cutlasses were the first swept-wing Navy jets, the first tailless aircraft to go into production for the U. S. military, and the first Navy fighters with a steerable nosewheel.

prepare a boundary layer separation plate for each intake. Make this from very thin sheet plastic and trial fit, but do not glue in place at this time. Similarly, prepare the afterburner pipes, but do not glue at this time.

Now paint the inside of the fuselage halves, the intake blanking plates, and the boundary layer separation plates light gull gray (FS 36440). Paint the light-blocking bulkhead and the afterburner nozzles flat black. After the paint dries, glue all pieces in place, fig. 6. Let the glue dry, then add body putty fillets to fair in the side of the fuselage and the intake blanking plates. Use white glue to make fillets between the fuselage side and the boundary layer separation plate. File and sand the fillets until they are perfectly smooth, then repaint.

Cockpit detailing — Cut out the cockpit area in both fuselage halves, smoothing the edges with files and sandpaper. The kit includes a main instrument panel and a cockpit tub that crudely represents part of the seat assembly and side instrument panels: You may want to add more details to the cockpit, particularly if you plan to display the model with the canopy open. My model includes rudder pedals, control stick, seat belts and cushion, and detailed instrument panels. The cockpit interior is dark gull gray (FS 36231).

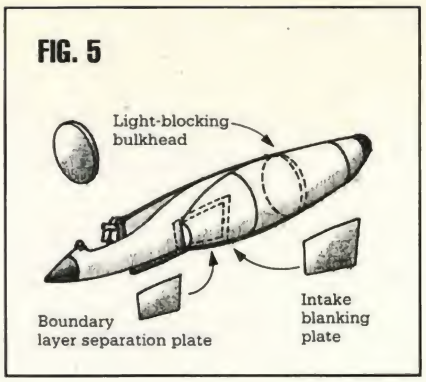
At this time also install a bulkhead behind the cockpit, and the nosewheel well floor. Prepare a bulkhead to accept the nose landing gear strut. Add weights to the nose so that the plane won't later sit on its tail: I simply stick lead fishing sinkers in nonhardening modeling clay.

If you want to replace the molded arrester hook with a more detailed scratchbuilt hook or one cannibalized from another kit, cut out the molded hook and patch the resulting hole with thin sheet plastic and body putty.

Assembling the fuselage halves — Glue small plastic flanges to one fuselage half at five or six locations. (The more flanges the better, because they form far stronger joints than the butt joint along the edges of the fuselage halves.) Double-check that the halves mate smoothly, apply plastic cement to the exposed portion of the flanges and along the edges of one fuselage half, and mate the two halves. Use strips of masking tape to hold the halves together while the glue dries. Set the fuselage aside and let the glue dry thoroughly.

Belly pod — Cutlasses carried several types of detachable belly pods: The Rareplanes kit includes parts for a camera pod, fig. 7. Sand and file the pod to the approximate shape of the bottom of the fuselage; we'll do final sanding later. Drill or cut out the holes for the camera lenses and install a scrap plastic light-blocking bulkhead inside the pod. Paint the inside of the pod dark gull gray. Simulate the camera lens holders with round sprue painted flat black. Make the lenses from clear plastic, Micro Kristal-Kleer, or white glue.

Wing and vertical stabilizers — The Cutlass wing featured full-length leading-edge slats, speed brakes, and unusual control surfaces that combined the roll and pitch functions of ailerons and elevator. Chance Vought called these "ailevators." All of these are represented



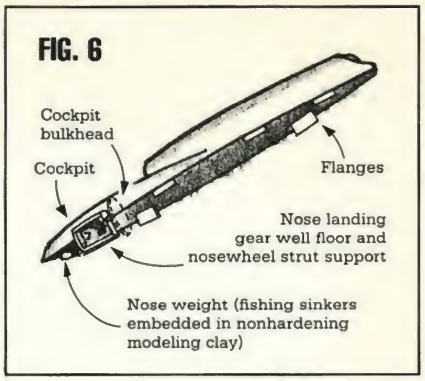


FIG. 7. Build by subassemblies (two shown here), filling all seams as you go.

FIG. 8. In order to preserve detail on the outer surfaces, sand only the inside portions of the wing parts. Sand carefully until the trailing edge is sharp and the airfoil is symmetrical.

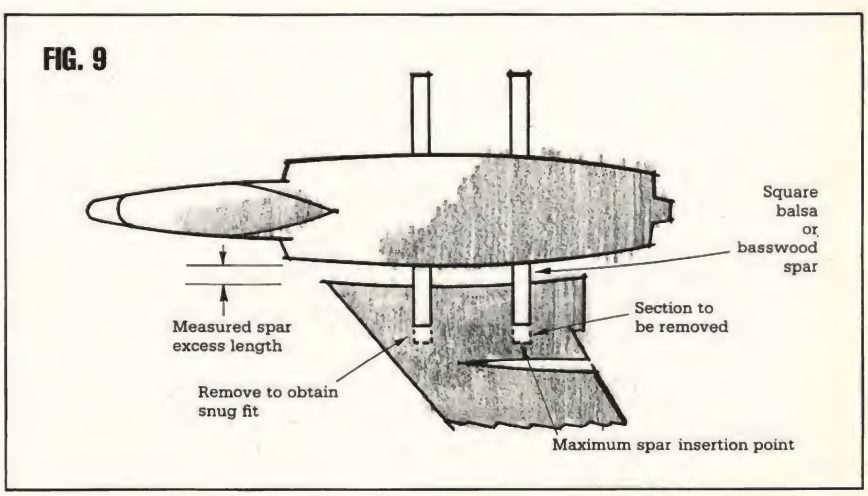


FIG. 10. Here the fuselage, wing, and vertical stabilizers are ready for final assembly. Mount the wing halves now, but hold off on the vertical stabilizers until you've installed the canopy.

FIG. 11. Trim the canopy, attach with white glue, seal the seam with white glue, paint the seam with gray paint, and apply putty until the canopy fairs smoothly into the fuselage.

on the Rareplanes parts, so be careful to sand only the inside surfaces of the wing parts. Sand the parts with wet-or-dry sandpaper on a flat surface, just as you did the fuselage parts. Check frequently and keep sanding until the wing parts reach scale thickness — the airfoil should be symmetrical and the trailing edge should be sharp, fig. 8.

Tape the wing parts together and test fit the wings to the fuselage. You may have to sand off more plastic at the wing root or beef up the wing root with thin sheet plastic. The Cutlass wing had no dihedral or anhedral, so the wing halves should be perfectly level. Remove the wing halves from the fuselage and glue the wing pieces with liquid plastic cement. Use liquid cement because tube-type cement might dissolve portions of the trailing edge.

Prepare and assemble the vertical stabilizers just as you did the wing. You may want to add more detail to the main landing gear wells and doors that are part of the vertical stabilizer assemblies: Do so with body putty and pieces of sheet plastic.

Fillers — Now that the major subassemblies have been prepared, it's time to go back over all of them, filling seams and patching defects. Use your favorite filler: Squadron Green Putty, Duratite Plastic Surfacing Putty, and 3M Acryl-Red Putty work well, and you may know of others. Apply the putty with a palette knife, paintbrush, toothpick, or whatever other tool you prefer. Wet-sand and file after each coat dries, and fill, file, and sand until all seams are invisible and all defects have been fixed. Yes, this takes a lot of time, but it's the only way to achieve a good finish.

Mounting the subassemblies — Cut two square holes in each side of the fuselage and insert square balsa or basswood spars through the holes. Glue the spars to the fuselage with epoxy or white glue. Lay the wing halves over the spars and mark their location on the wing root rib. Cut squares at these marks and slide the wing halves onto the spars. If the spars are too long, remove the wing, and cut off the excess wood, fig. 9. Glue the spars to the wing with epoxy or white glue and attach the wing root to the fuselage side with liquid plastic cement, fig. 10. Keep in mind that the Cutlass wing was perfectly level. Let the adhesives dry thoroughly, then fill any gaps with body putty.

FIG. 12. Prime all parts with flat white or gray paint and inspect for defects.

Place a piece of fine-grit sandpaper on the fuselage where the belly pod is to be mounted, and gently sand the belly pod until it exactly matches the fuselage contours. Then cement the pod to the fuselage and fill the seams.

Prepare the canopy backplate and paint it the same gray as the cockpit. (This plate separated electronic gear in the rear of the canopy from the rest of the cockpit.) Trim the canopy with a hobby knife and sandpaper until its edges exactly match the fuselage contours. Attach the canopy to the fuselage with a tiny amount of white glue. After this glue dries, brush white glue around the seams to completely seal the cockpit. Then paint the seams and lower canopy frames with the gray paint used on the cockpit interior, fig. 11. This coat of gray paint is important because it ensures that colored fillers applied later around the canopy seam won't be visible through the canopy.

Decals

I used six decal sheets for the lettering and insignia on my F7U-3M:

- An old Finishing Touch sheet, "U. S. Army/Navy markings," for the red jet intake markings and warning plaques.
- Micro Scale No. 13-15, "U. S. wargames armour," for the white stars on the squadron markings.
- Micro Scale No. 72-164, "Phantom data," for panel markings.
- Micro Scale No. 72-83, "Current U. S. Air Force insignia."
- Micro Scale No. 72-25, "U. S. ID letters and numbers," for the large aircraft serial number.
- Micro Scale No.. 80-70-2, "Railroad gothic alphabet and numbers."

FIGS. 13 and 14. Paint, detail, and decal vacuum-form models just like any other plastic kit. The author usually attaches detail parts with white glue.

The white glue we've used so far doesn't mar clear plastic, but most fillers do, so cover the canopy completely with tape or masking fluid, then fill the fuselage/canopy seam with putty. File and sand carefully, and fill, file, and sand until the canopy fairs perfectly into the fuselage.

Now glue the vertical stabilizers to the wing. Fill, file, and sand the joints. "Fill, file, and sand" is the litany of vacuum-form modelbuilders — we must buy most of the putty sold in hobby shops!

Finally, glue the rocket mounts to the bottom of the wing with tube-type plastic cement and fair the seams with white glue.

Cover all openings with tape or masking fluid, clean the model thoroughly (rubbing alcohol is a good cleaning fluid), and spray on a primer coat of flat white or gray paint. The primer can be any flat paint that is compatible with the paints you plan to use for color coats, fig. 12. After the primer dries, check for unwanted seams and other defects. If you find any, fill, file, and sand, and prime again.

I prefer to add landing gear struts and other fragile items after I have painted and decaled the rest of the model, but if you like to add these at this stage, that's okay too.

Colors — Based on information provided by Rareplanes and Vought Corporation, I painted my model light gull gray (FS 36440) on top, white on the bottom. The ailevators are white on both surfaces. The radome on the nose and the anti-glare panel around the canopy are flat black. Squadron trim markings are royal blue (FS 15050), figs. 13 and 14. The Rareplanes plans and the photo of a 3M on page 28 show where lettering and insignia go. The sidebar on page 31 shows which decals I used.

Vacuum-form models are painted, detailed, and decaled just like any other plastic model, so use your favorite materials and techniques for these steps, then proceed with final assembly.

Final assembly — I recommend white glue as the adhesive for attaching the landing gear, pitot tube, ordnance, and other parts. Why? Because white glue gives you a long working time, has enough tack to hold small pieces without clamps or tape, and forms a strong enough bond that parts are held securely. Yet another virtue is that should a part break off when you're handling the model, the break will occur at the glue joint, so repairs are simple.

I think the photos of the completed Cutlass prove that you can build a handsome model from a vacuum-form kit. Vacuum-form kits do take longer to assemble than injection-molded kits, but construction is straightforward and once you've completed basic assembly, you're back on familiar ground when you detail, paint, and decal the model. Given the ever-increasing cost of injection-molded kits and the growing interest in modeling rare or exotic aircraft, I'm sure there will soon be even more vacuum-form kits on the market. Build one. It's fun. **FSM**

Meet E. Richard Staszak

A modelbuilder for 40 years, E. Richard Staszak has concentrated for the last 20 years on 1/72 scale aircraft, especially vacuum-form models. He's president of the Space Park chapter of IPMS in Redondo Beach, California, and has written many articles for the chapter's newsletter, *The Replica Wrap-up*. He's now hard at work on a new Kalmbach how-to book about vacuum-form aircraft models.

Richard's other hobbies include model railroading and military history.

The completed model is ready to take its place in the author's collection of fighters. Cutlasses were kept in immaculate condition, so go easy on weathering.

FIG. 1. A captured FW-190F-8 during flight tests at Freeman Field, Seymour, Indiana, about 1947. This is FE-116, a sister of FE-117, the subject of the NASM's restoration. This plane has apparently been disarmed because there are no wing root cannons. It is painted in spurious Luftwaffe markings and the identification number (FE-116) is black. The aircraft was destroyed after the flight tests.

National Air and Space Museum

Modeling the National Air and Space Museum's FW-190F

The Smithsonian will roll out its restored FW-190F-8 later this year. With just a little effort, yours can be ready at about the same time

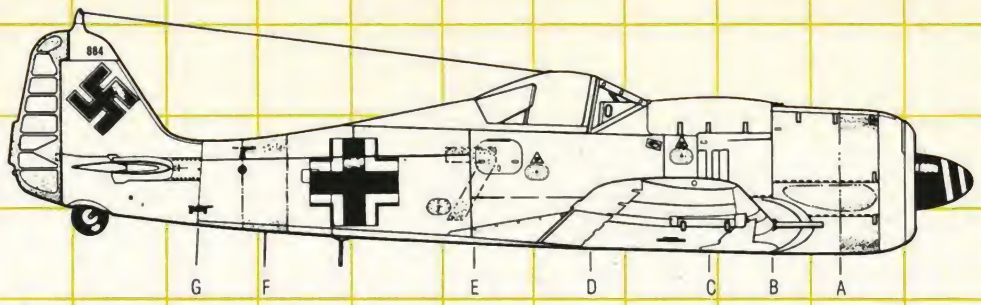
BY ERNEST PAZMANY

THE FOCKE WULF FW-190 first flew on June 1, 1939 and entered squadron service in August 1941. Focke Wulf Flugzeubau, GmbH, manufactured at least 19,000 of these single-seat aircraft, which were powered by a reliable 1,700 hp (takeoff and emergency power) BMW 801D 14-cylinder two-row air-cooled radial engine.

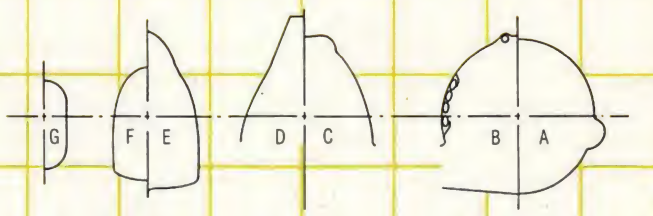
The FW-190 is universally acknowledged as one of the best aircraft of World War II. The planes were fast, maneuverable, easy to maintain, and could survive considerable battle damage. Focke Wulf 190s were used as fighters, interceptors, bombers (a few raided England), and as ground-attack aircraft. They soon acquired the nickname *Würger*, German for "shrike," the robin-sized butcher bird, *Lanius excubitor*, that impales its prey on thorns. In this article, I'll describe how to convert the Monogram 1/48 scale FW-190A to a replica of the National Air and Space Museum's FW-190F-8, a ground-attack version.

About the NASM FW-190F-8 — Before starting on the conversion, a little background on the NASM's Focke Wulf FW-190F-8 is in order. Most F-8s were built on the production lines alongside the A-8 version, an interceptor. Special features of the F-8 included additional armor in the fuselage, especially in the forward cowl ring area. Extra armor plating was also installed behind the cockpit headrest. Several armament kits were designed for bombing and strafing missions. The F-8s served with ground-attack forces on the Eastern and Mediterranean fronts.

However, the NASM's FW-190F-8



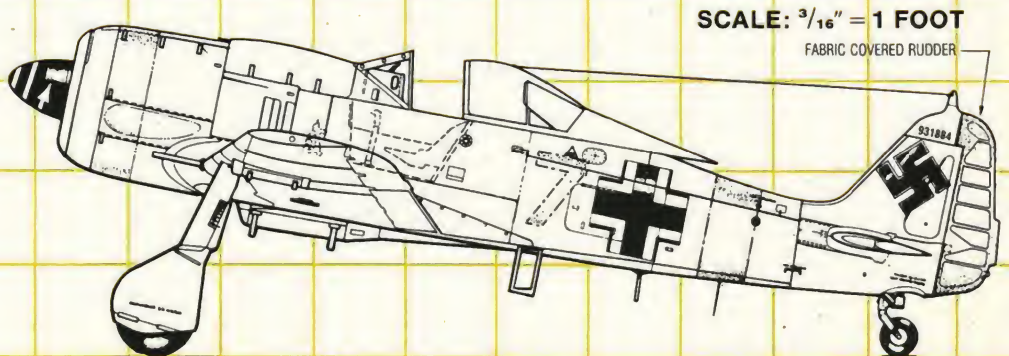
PREPARED FOR
FINESCALE MODELER
BY
Bill Koster



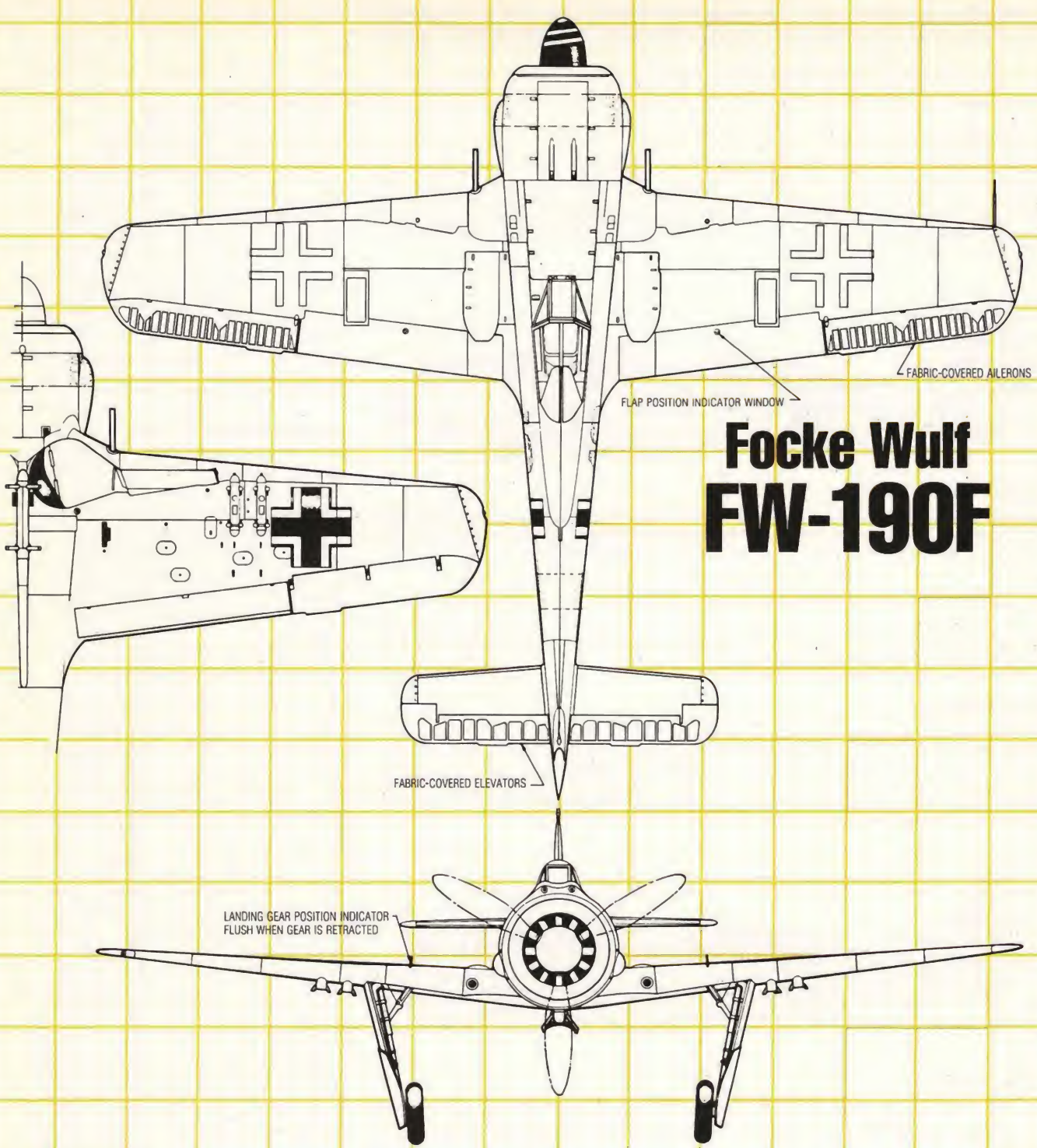
All photos this spread, FINESCALE MODELER; A. L. Schmidt

The author's 1/48 scale model re-creates in miniature the NASM's restored Focke Wulf FW-190F-8.

SCALE: 3/16" = 1 FOOT



Focke Wulf FW-190F



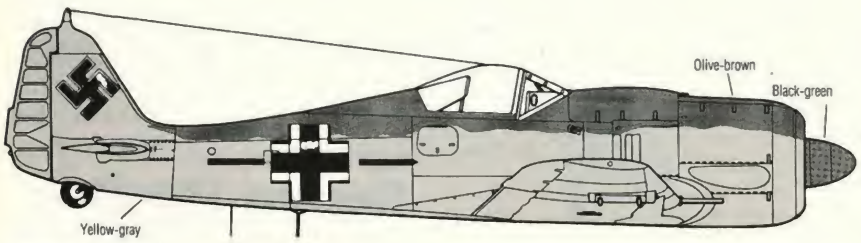
The model is built from Monogram's 1/48 scale FW-190 kit and a conversion kit by Bill Koster.

Alternate color schemes

Color schemes used on the National Air and Space Museum's FW-190F, based on drawings and data provided by Bill Koster and Robert C. Mikesh.

COLOR SCHEME I

The first color was applied when the plane was an A-7. The upper surfaces were an olive-brown different from any standard Luftwaffe or Italian tropical color. This color was applied to the upper third of the fuselage decking, merging into the underside color, an unusual pale yellow-gray. The fuselage bar markings indicate the plane was assigned to a squadron captain of the second group; unit unknown. The scheme may have been an attempt at a tropical finish.



COLOR SCHEME II

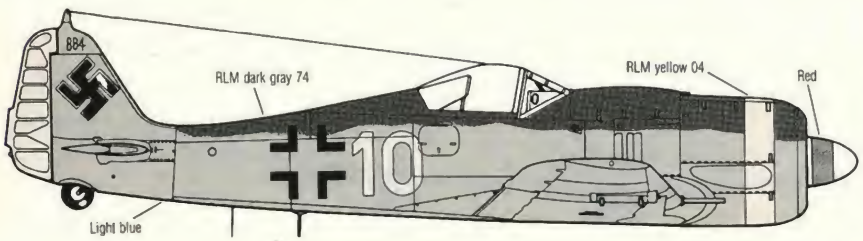
The second scheme involved painting out the squadron captain bars with RLM Gray 02. A white "7" was painted forward of the fuselage national insignia. A pale yellow (RLM 27) fuselage band was painted aft of the crosses. The airplane was still a type A.

COLOR SCHEME III

The model and the restored plane are painted in this scheme, one used when the plane was in service during the latter part of 1944 as an F-8. This scheme is described on page 39 and is shown in the large drawings.

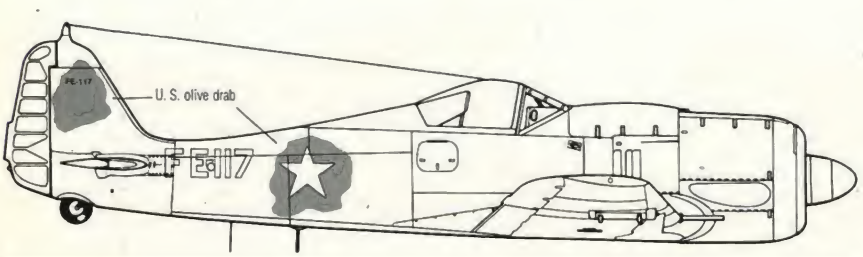
COLOR SCHEME IV

This scheme was applied in early spring of 1945. The upper surfaces were repainted a solid dark gray (RLM 74). The gray-blue undersides were repainted with a light blue similar to RLM 76. The rudder was painted a deep yellow (RLM 04). The spinner was painted with a white leading portion, a red center, and an RLM black-green 70 rear band. The earlier white "7" was painted over with a "10" in RLM yellow 04. A yellow (RLM 04) band was painted on the forward cowling ring.



COLOR SCHEME V

This scheme was applied after the war by American technicians. Olive drab was sprayed over the original German insignia and white stars were painted over the Luftwaffe markings. Aircraft identification number FE-117 was painted in 12" characters on the rear fuselage. Later, the airplane's upper surfaces were repainted in a medium gray with fake German insignia. The plane wore this livery when transferred to the National Aeronautical Collection.



began its career as an earlier A-type fighter, probably an A-7 interceptor. Late in 1944 the plane was changed to the F-8 ground-attack variant. This major conversion was done in the field, where a new wing and other parts were mated to the A-7 fuselage. Perhaps because the conversion was done at a repair depot, there is no extra armor plating in the cowl ring. The plane was then assigned to SG2, a ground-attack unit in Hungary.

After Germany surrendered in May 1945, American technicians seized the plane, designated it FE-117 (FE stands for Foreign Equipment), and brought it to the United States, where it was tested by the Technical Service Command and then stored at Freeman Field, Seymour, Indiana. In 1949, the FW-190 was shipped to the unused Douglas Aircraft assembly plant at Park Ridge, Illinois, from which it was in turn transferred to the National Aeronautical Collection. It was later moved to the Smithsonian Institution's storage and restoration facility at Silver Hill, Maryland. It is now the subject of a restoration project that will re-create, in every detail, a typical Focke Wulf FW-190F ground-attack fighter.

Monogram and Koster kits — I still remember buying the first issue of Monogram's 1/48 scale FW-190. To a boy of 14, it was a fabulous model packaged in a bright red and yellow box. Sixteen years later, the FW-190 is still available, although the price has nearly tripled and the box isn't as appealing. When I decided to model the NASM's FW-190F-8, I was once again drawn to the Monogram kit.

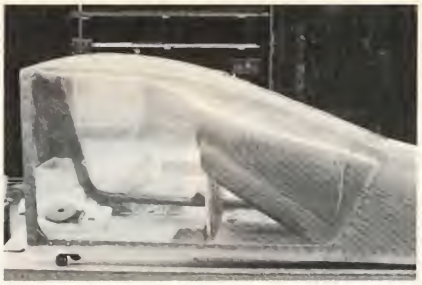
I also bought a vacuum-formed conversion kit from Bill Koster's Koster Aeronautical Enterprises, 170 Grange Road, Wheeling, IL 60090. The kit costs $4.00 and includes parts to convert the FW-190A into the D or F version, as well as parts to convert Monogram's de Havilland Mosquito into any of several late versions.

Building the model — I first studied Bill Koster's drawings of an FW-190F-8; these have been redrawn to show the NASM plane and appear on pages 34 and 35. I visited the Smithsonian's archives where I found a rare photo of a sister aircraft, FE-116, as it appeared during the tests in Indiana, fig. 1. I also took photos of components of the NASM plane during the present restoration, figs. 2, 3, 4, 5, and 6.

I began construction by painting the cockpit interior Pactra Panzer Grey (IM68), a color which closely matches the black-gray on the NASM plane. I made seat belts from ordinary surgical tape, the kind sold at your neighborhood drugstore. I painted the belts light tan, then glued on 1/48 scale buckles sold by Unique Scale Hobbies.

Exhaust ports — I then opened up the

All photos this page, Ernest Pazmany



(Above) FIG. 2. The sliding portion of the FW-190F-8 canopy in the NASM restoration shop. (Left) FIG. 3. Close-up of the canopy, looking aft. The headrest is red, other parts are black-gray.

molded exhaust ports with an X-acto hot knife and smoothed the edges with files and sandpaper. I cut eight ½" lengths of 1/32"-diameter aluminum tubing and crimped one end of each piece with pliers. Using Krazy Glue, I glued four of these exhaust tubes in each port, fig. 7. Note that the ends of the tubes are flush with the outer lip of each port.

The FW-190 also has a ventral exhaust port on the fuselage center line just forward of the landing gear wells, fig. 8. This feature is not included on the Monogram kit, so I opened the port with a hot knife, filed it smooth, and installed four pieces of 1/32" tubing, mounted vertically, to represent the exhaust tubes. I later covered the port with a thin sheet-plastic flap.

Louvers — The engine-cooling louvers on the Monogram kit simply don't look right: They are too thick and are molded into the fuselage. I removed them with a sharp knife, sanded the fuselage surfaces, and attached (after seam filling and priming) new louvers made from thin sheet plastic, fig. 9. The sheet plastic came from, of all places, the local cafeteria. The plastic lids on Styrofoam coffee cups provide the thinnest sheet plastic I have ever seen. Apply liquid plastic cement sparingly to this thin plastic because it dissolves easily. Or, use cyanoacrylate cement.

Landing gear — The main landing gear came next. The bottom half of the Monogram wing contains molded locating tabs for the main landing gear struts. These cause the struts to tilt too far inward, so remove them and move the struts farther toward the wingtips until they assume the angle shown in the large drawing.

I made the inboard wing 20 mm cannon blast tube housings inside the main landing gear well from 1/32" and 1/16" brass and aluminum telescoping tubing, fig. 10. I then cut thin sheet plastic to form bulkheads that conceal the fuselage-to-wing gaps that would otherwise be visible through the wheel wells. The wheel wells were airbrushed with Humbrol RLM *Grau* 27 (HG. 6).

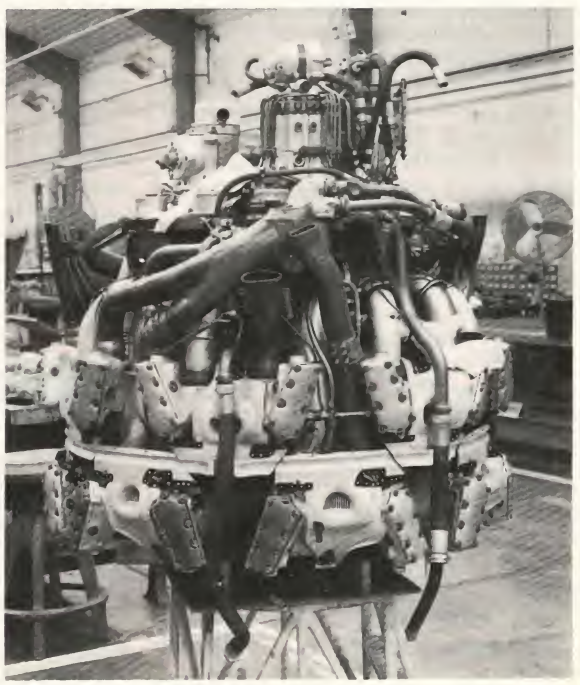
Fuselage breech cover — The bulging machine gun breech cover in front of the cockpit is a distinguishing feature of the FW-190F-8. I made this breech cover with one of the parts in the Koster conversion kit and a portion of Monogram part G-18. I cut part G-18 into 2 pieces, sawing at the point where the barrels emerge from the fuselage, fig. 11, and discarded the aft portion. I removed 1 3/16" of the forward portion of the Koster breech cover and glued it in place. (The forward portion is used only with the D conversion.) I used an industrial liquid plastic cement, IPS Weld-on #4, to mate the Monogram and Koster parts. This cement gives a stronger bond than hobby liquid cement.

Seam filling and priming — After the fuselage halves were cemented (minus the cockpit subassembly), and after the Monogram and Koster pieces for the gun breech were trimmed and glued in place, I applied Green Stuff to all of the fuselage joints, let the putty dry, and sanded the seams with No. 400 and No. 600 grit wet-or-dry sandpaper. The breech-to-fuselage joint required several coats of putty.

I then primed the fuselage with a medium-gray paint, let this dry several days, sanded gently with No. 400 and No. 600 grit wet-or-dry sandpaper, and primed again. This procedure is time-consuming, but ensures invisible seams.

Rudder — Using a new No. 11 X-acto blade, I cut the rudder from the vertical stabilizer, smoothed the edges, and reinstalled the rudder a few degrees to the right of the fuselage center line to make the model look less static. Weld-on #4 again worked perfectly, filling

(Above left) FIG. 4. The propeller spinner before restoration. Colors are a white spiral over an azure base. (Above right) FIG. 5. One of the main landing gear wheel and tire assemblies. The solid cast wheel is painted semigloss black. American technicians probably applied these colors to the spinner and wheel after the war.



(Right) FIG. 6. The beautifully restored BMW 801D-2 air-cooled radial engine used to power the FW-190. Here, the propeller shaft points downward and the exhausts protrude up. The exhausts facing the camera exit through the ventral ports.

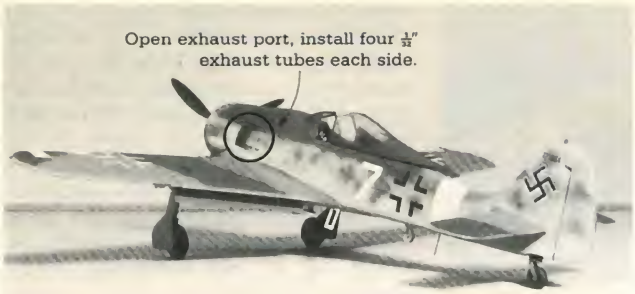
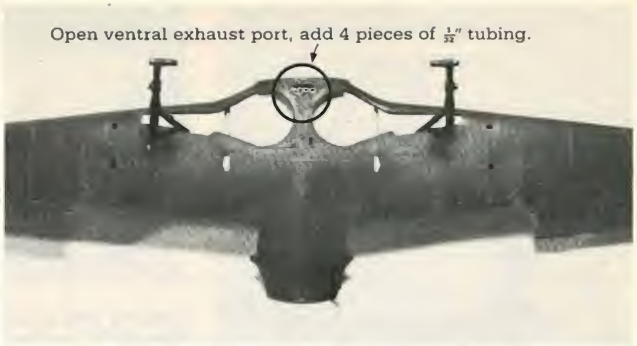


FIG. 7. Continue the conversion by improving the molded exhaust ports on the Monogram kit.



All Photos not otherwise credited, FINE SCALE MODELERS: A. L. Schmidt

FIG. 8. Don't forget the ventral exhaust under the wing.

FIG. 9. Drill a small access hole for the manual starter crank on the left side, remove the molded louvers, and add sheet-plastic louvers on both sides.

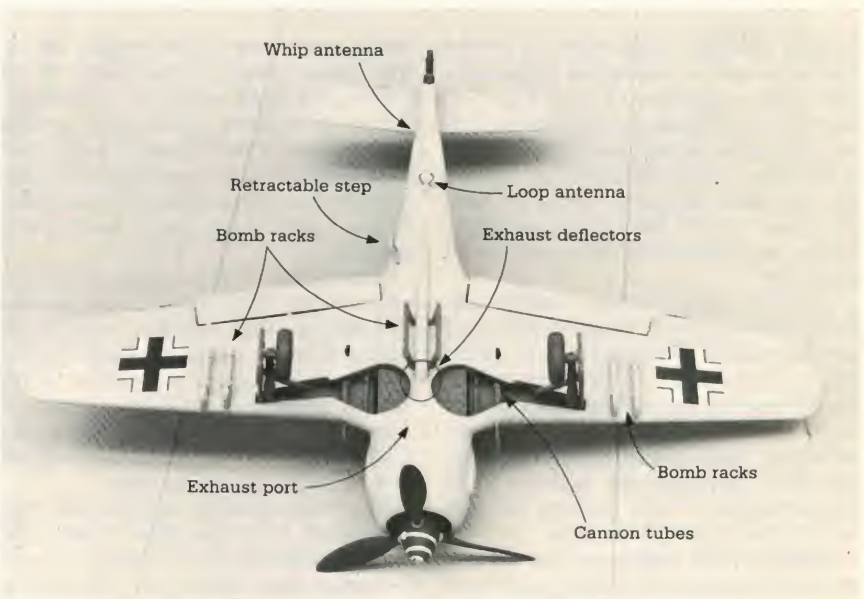


FIG. 10. Koster vacuum-formed conversion kit parts, spare parts from other kits, stretched sprue, thin sheet plastic, and aluminum tubing provide material for the underside details.

the small gap created when cutting the rudder from the vertical stabilizer.

Outer wing cannon breech covers —In addition to two inboard 20 mm cannons, most FW-190s carried two outer 20 mm cannons, one on each wing half. These outer cannons were not used on the FW-190F-8, though the standard breech covers were present on the top of the wing, fig. 12. Therefore, I removed the outer cannons on the upper wing pieces and made breech covers from scrap plastic.

I then installed the cockpit assembly, glued the wing halves to the fuselage, attached the horizontal stabilizer pieces, and filled all gaps with putty. I trimmed and polished the windshield, and then cemented it to the fuselage.

Canopy — Next came the canopy. Koster supplies a good version of this bulbous canopy, although purists may complain that the front is too rounded and that the top is too curved. I glued the curved armor plating, Koster part 12, to the canopy frame, Monogram part G-12, fig. 13. I made a new headrest because the NASM FW-190F-8 has a round headrest, not the half-moon shape supplied by Monogram. Before adding the Koster canopy, I painted the canopy frame black-gray and the headrest red. I applied the Monogram decal for the headrest plate and cemented the Koster canopy to the frame with Krazy Glue.

Ordnance racks — The NASM plane features a ventral center line weapons rack and four wing bomb racks. The Monogram kit includes the center line rack, but has only two wing racks. The additional wing racks are in the conversion kit, but to make life easier, I just used spare racks left over from an earlier FW-190 kit. The bomb shackles are plastic scrap, fig. 14.

Wheels and other details — Cast-metal wheels were standard on the main landing gear on F-series planes. A search through my spare parts box produced a suitable pair of Monogram Messerschmitt BF-109G wheels, fig. 15. The Revell 1/48 scale BF-109G/K model also has excellent wheels of this type.

Before painting the model, I added a few more details. I cut a 1/32" x 1/32" piece of thin clear plastic and glued it in front of the cockpit, just to the right of the fuselage center line. This simulates the Revi gunsight.

I installed sheet plastic exhaust deflectors on the wheel well rims on both sides of the center weapons rack, fig. 10. I glued on a new loop antenna (spare parts box to the rescue) and

Ernest Pazmany

FIG. 11. The machine gun breech cover in front of the cockpit is made from Monogram and Koster parts and lots of putty.

made a whip antenna as well as the landing gear position indicators on the wings from stretched sprue.

As a final touch, I drilled a small hole between the exhausts and louver doors on the left side of the fuselage, fig. 9. This represents the access hole for the manual starter crank.

As I have mentioned, all parts were primed and sanded before applying color coats. I then washed the model with warm water and dishwashing detergent, rinsed it, and let it air dry.

Color scheme — The color scheme on the Smithsonian FW-190F-8 is unusual, but the NASM technicians believe it is an accurate reproduction of the colors used on this plane in late 1944. (Other color schemes are shown on page 36.) The undersides are a pale gray-blue similar to RAF Sky Type S and FS 24424. The upper surfaces are painted in a standard factory camouflage pattern, but with an unusual combination of RLM black-green 70 (FS 34052) and RLM gray-violet 75 (FS 26152).

The fuselage sides and tail feature a soft blotch pattern of RLM gray 02 (FS 36251), merging into a heavier blotch pattern of RLM gray-violet 75. The fuselage band, the V on the left half of the wing, and the lower third of the vertical stabilizer are RLM yellow 27. These yellow markings designated SG2 aircraft. Note that the upper portion of yellow on the vertical stabilizer blends softly into the gray.

The propeller and spinner are RLM black-green 70 with a white spiral over the base coat. The spiral may or may not have been used on this particular plane, but it is a decorative accent that was often seen on other SG2 aircraft.

During the winter of 1944-45, irregular white snow camouflage splotches were painted on the upper surfaces of some FW-190s. These snow camouflage patches do not appear on the Smithsonian plane or my model.

Paints — Here are the paints I used:

- Gray-blue — I checked my copy of the *Official Monogram Painting Guide to German Aircraft, 1935-1945* and matched this color with Humbrol Sky Type S (HB.5) tinted with a little gray. I thinned this with a mixture of equal parts mineral spirits and lacquer thinner.
- Gray — Humbrol RLM *Grau* 02 (HG.6).
- Gray-violet — A mixture of several Polly S grays thinned with denatured alcohol and water.
- Black-green (on the airframe) — Pactra Black Green (IG 14).
- Black-green (on the propeller assembly) — Humbrol *Schwarzgrun* 70 (HG.1), which is darker than the Pactra equivalent.
- Yellow — A mixture of several paints to match RLM yellow 27.

FIG. 12. Focke Wulf FW-190F-8s did not carry cannons in the outer wing sections, but did have a breech cover on the top of each wing half.

FIG. 14. Wing bomb racks with bomb shackles go just outboard of the main landing gear struts.

Spinner — To paint the spiral design on the propeller spinner, I first applied a white base coat, then masked the spiral with thin vinyl striping tape. The thin plastic tape conformed easily to the curved surfaces of the spinner. I then sprayed the spinner and propeller blades with Humbrol *Schwarzgrun* 70. After removing the tape and touching up, I glued the propeller assembly to the front cowling.

Decals and weathering — I used decals from sheets of 1/48 scale Luftwaffe markings and applied them exactly as the markings appear on the NASM FW-190F. Observe that the only stencils on the NASM plane and my model are two yellow octane triangles on the right side of the fuselage.

After I had applied all decals and had sprayed the model with a final clear flat finish, I picked out a few details with a thin wash of gray acrylic paint and water. The exhausts, propeller cuffs, and wheel hubs received a dusting of dark gray pastel chalk.

Conclusion — The product: An accurate 1/48 scale model of the NASM's FW-190F-8. Oh yes, by the way, the National Air and Space Museum will roll out its restored aircraft for display at the Paul E. Garber Facility, Suitland, Maryland, in mid-1982. FSM

Ernest Pazmany

FIG. 13. Glue the small white plastic rounded armor piece, Koster part 12, to the Monogram canopy frame.

FIG. 15. The solid landing gear wheels are from a Monogram BF-109G.

Kathleen L. Brooks-Pazmany

Meet Ernest Pazmany

Ernest Pazmany, a modelbuilder and kit collector for some 20 years, is a buyer for the museum shops of the Smithsonian Institution. His wife, Kathleen L. Brooks-Pazmany, works for the Smithsonian as a researcher for the National Air and Space Museum: She somehow tolerates Ernest's plastic model habit and even helped shoot photos for this article. Ernest also thanks Bill Koster, Donald Lopez, Mike Lyons, Robert C. Mikesh, and the staff of the National Air and Space Museum for help with this article.

Modeling Prince Poniatowski with parts and putty

This 54 mm figure conversion approaches scratchbuilding. Pay close attention to the author's suggestions on posing rider and horse

BY PETER TWIST

PRINCE Józef Antoni Poniatowski was the epitome of a Napoleonic light cavalry officer: courageous, daring, and loyal. A Polish nobleman and professional soldier, he fought for Poland and France. In 1807 Napoleon made him minister of war of the newly created grand duchy of Warsaw.

Poniatowski was wounded at Smolensk while in command of the fifth army corps during the campaign against Russia in 1812, and his heroism at the Battle of Leipzig led Napoleon to create him a marshal of France on October 16, 1813. Three days later, while covering the retreat of the French army across the Elbe, he died.

Deciding on the pose — I set out to model Poniatowski using Historex* 54 mm horse and figure parts. For me, the most difficult aspect of any figure conversion is deciding on the pose. I elected to pose Poniatowski on horseback, his "natural environment," during the brief three days between being elevated to the status of marshal and his death. For a mounted piece such as this one to have drama and impact, man and horse must be combined into a unified composition; once this is achieved, the modeling itself is comparatively easy. After considerable experimentation I settled on having the horse bracing itself on a downhill slope, with the rider leaning back, twisting sideways in the saddle with sword upraised.

Rearranging the horse — The first part of any mounted figure conversion is to pose the horse. I started by sawing the Historex horse halves through the belly to produce front and hindquarters. I used front legs from body parts Nos. 9 and 16, and hind legs from parts Nos. 1 and 10. The horse's head is raised and turned, so head No. 2 is most appropriate.

To raise and rotate the head, I cut a wedge out of the neck, fig. 1. This wedge was thick at the top, thin at the bottom. Gluing this wedge back in place upside down raises the head, and rotating the wedge turns the head to one side or the other. I added the ears facing backward to imply that the horse is tense and excited. The mane and forelock are left off for now.

I feel Historex horses are too light in build — not broad enough. To compensate, I added shims between the body halves; Historex bases just happen to be the ideal thickness for this. I traced around one of the horse halves to determine the shape of the shim, then cut it out of the base.

To assemble the horse I first cemented all four body quarters to the shim, then added the head to the body. After the cement dried I drilled holes into the three legs that touch the ground and inserted wire pins to provide firm attachment points to the base. During construction these pins also serve as handles, fig. 2.

Next, I filled the gaps between the body sections of the horse with A+B epoxy putty.** Epoxy putty, which can usually be found at plumbing supply stores, is ideal for filling because it can be shaped like clay while soft but sanded and carved when hard, and cures in an hour. I trimmed the neck wedge flush with an X-acto blade, then used epoxy putty to reshape the neck.

Because of the extra width added by the body shim, I spent a good deal of time making sure I had a smooth, seamless joint between body and neck. After the epoxy putty had hardened, I carefully sanded it to conform to the body shape and the musculature of the horse. That done, I added the mane, forelock, and tail parts to the body. I cut the mane into segments with an X-acto knife so I could make it follow the curve of the reworked neck.

Posing the Prince — The rider's pose requires a good deal of cutting, and I'll admit right away that I did not keep careful record of which Historex parts I used, so I can't list them. I started by cutting a wedge from the upper torso (a single-breasted tunic version) with a razor saw. This wedge was thick at the back of the torso but thin at the front. When I replaced the wedge I reversed it, tipping the body back and rotating it to the figure's left, fig 3.

For legs, I started with Historex lancer riding legs. Both were cut at the knees; the left leg was also cut at the

* Historex parts are available from their U. S. distributor: Coulter-Bennett Ltd., 12158 Hamlin St., North Hollywood, CA 91606.

(Left) FIG. 1. In addition to these cuts, the author also placed a shim between the halves to make the animal wider.

FIG. 2. The horse after assembling and filling. Note the large area of filler required where the neck meets the widened body, and the unfilled gap which will be covered by the saddle and blanket.

** One source for Biggs A+B Epoxy Putty is the Brookstone Company, 127 Vose Farm Road, Peterborough, NH 03458.

FIG. 3. At this point the Prince doesn't look particularly human, but the photo does show the extensive repositioning required to pose the figure.

FIG. 4. The completed horse before priming and painting. The saddle and blanket were built up in place from epoxy putty. Straps are sheet plastic.

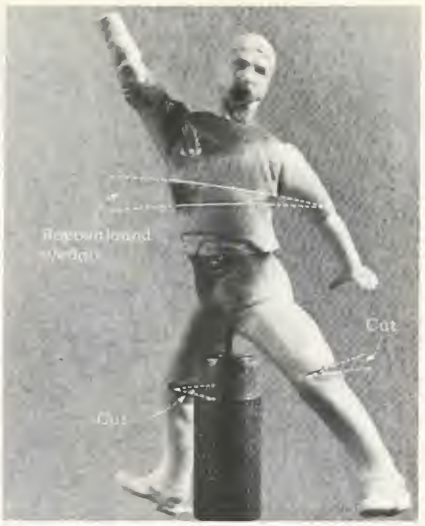


FIG. 5. Compare this view and figure 6 to figure 3. Here, most gaps have been filled with epoxy putty, but there are still areas that require more work.

FIG. 6. A rear view of the figure shows the extensive epoxy putty fillet used to blend the neck into the torso and to form the right shoulder.

FIG. 7. The Prince's teeth, lips, and the moustache were built up using automobile spot putty thinned with acetone and applied with a brush.

FIG. 8. Here the completed figure is ready for priming. The dark areas are epoxy or spot putty; light areas are the original plastic parts.

hip. After rotating the upper leg sections at the main joint where they meet to thrust the left leg back and the right leg forward, I cemented them together. Next, I reattached the lower legs, adding plastic wedges to straighten and rotate them. I also drilled a hole between the leg sections and glued in a pin with Krazy Glue to serve as a handle and to fasten the rider to the saddle later.

Positioning the figure's arms was the most difficult aspect of the conversion. To provide a realistic slope across the shoulders and conform to the twist of the body, the raised right arm is a straight arm turned palm up and moved slightly forward to center it on its shoulder socket. The left arm was moved down and back in its socket.

To replace the Historex hands, I cut the left arm off at the elbow and substituted the entire lower arm and hand from an Airfix multi-pose figure, using a plastic wedge to obtain the correct bend at the elbow. The right hand was part of the sword subassembly.

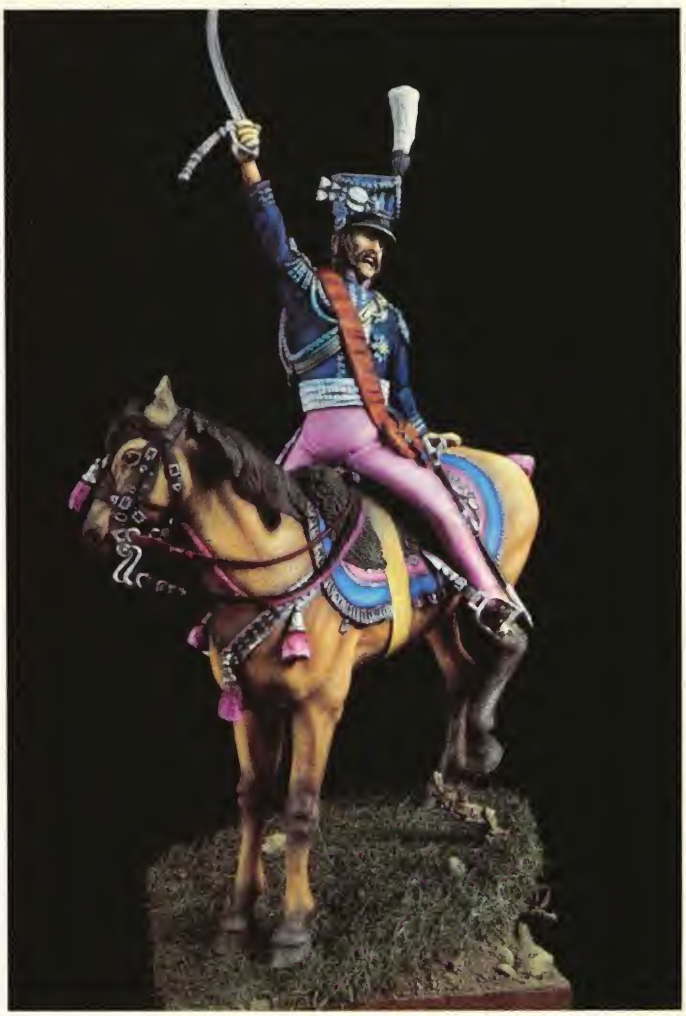
The head was positioned at an angle to the torso by means of a wedge, carefully removing some of the bottom of the neck to avoid making it too long. Finally, I drilled a 1/16" hole under the moustache to make the open mouth.

Combining horse and rider — The body is fitted to the horse by means of the saddle, exactly the way it works in the real world. None of the available saddles resembles the type revealed in my research on Poniatowski, so I built one using epoxy putty, fig. 4. I trimmed the corners of the blanket on the Historex Emperor's saddle to the proper contour and used it as a base for forming the putty. While soft, I textured the putty to simulate fur, cloth, and fringed areas.

After drilling a hole to accept the pin in the rider's body, I pushed the figure into the saddle while the putty was still only partially set. Then the figure was removed, leaving a clear imprint in the putty. This procedure ensures the rider will mate properly to the horse later on, and also adds a look of weight that might otherwise be lacking. When the putty set, I lightly sanded the saddle.

Completing the horse — Next I added the rest of the horse's equipment. Most are various Historex spare parts, but I

FIG. 9. The model after a coat of light gray primer.



The finished piece portrays Prince Poniatowski as he appeared after being designated a marshal of France. The carefully thought-out pose and superb execution convey the courage and character of this light cavalry officer better than words on a plaque could ever do.

used thin sheet plastic for straps, reins, and belts. Wind direction is an important factor; here, the breeze tilts all the tassels downhill. I textured the tassels lightly with a hot knife — I emphasize *lightly* because overworking textures with a hot knife produces deep caverns that look ridiculous.

Completing the figure — At this point the figure didn't look particularly human. I carefully trimmed away the excess plastic on the wedges, and built up the body contours with epoxy putty. The area above the right shoulder was built up considerably to simulate the way fabric bunches when an arm is raised, figs. 5 and 6.

I sculpted the open mouth using automobile spot putty. Available in most auto supply stores, this is intended for filling small dents in car bodies. When thinned with acetone, spot putty can actually be painted on with a brush to build up the teeth, chin, and moustache. After allowing it to dry several hours, I lightly sanded the spot putty to complete the face, fig. 7. Next, I fastened the czapska to the head and added the chin scales. I again used thinned spot putty to build the sideburns and hair out to the edges of the czapska for a realistic fit.

Body detail — I used Historex plastic parts wherever possible to complete the body detail. The marshal's sash and epaulet fringes were built up from epoxy putty, and the coattails and stirrup leathers were made from thin aluminum covered with epoxy putty. I first fitted the right hand (with sword) and the czapska plume, fig. 8, then removed them to facilitate painting. The medals and other small items came from various spare parts sprues.

After completing the figure, I airbrushed it and the horse with Floquil Primer, fig. 9. This renders all surfaces a uniform light gray, which reveals any remaining flaws.

I painted the piece in four subassemblies: the horse, rider, right hand and sword, and the czapska plume. Before painting, I built up the patch of ground on the base using epoxy putty, and pushed the pins on the horse's legs into it to establish their positions.

The figure, horse, and parts were painted with the correct colors of Polly S. These acrylic colors serve as underpaint for the thin coats of artist's oils applied over them. When the final coat of oil paint had dried I applied Micro Coat Flat to dull the gloss where appropriate. After painting, I glued the subassemblies together with 5-minute epoxy, textured the base with dirt and debris, and fastened the mounted figure to the base with 5-minute epoxy.

That completes the conversion. I want to emphasize that the strong impression made by the completed piece is fully 80 percent a result of the thought devoted to composing it. No amount of detail can compensate for a poorly animated figure, so spend enough time planning each of your conversions to ensure that the finished product will justify your efforts! FSM

FINESCALE MODELER: A. L. Schmidt

Other than Historex and Airfix plastic parts, the main ingredient in this conversion is a two-part epoxy putty similar to the material shown here.

Both photos, FINESCALE MODELER: A. L. Schmidt

Maxim No. 1: Choose a simple kit for your first ship modeling project. Assemble, paint, and rig the model carefully, and display it effectively.

Ship modeling tips for beginners

A short project that illustrates several useful techniques

BY LES WILKINS

IN ADDITION TO my own modelbuilding, I teach ship modeling classes at one of the Happy Hobby stores in Milwaukee, Wisconsin. Most of my students are young people aged 10 to 14, and I'm happy to say that several have become award-winning modelers. Why? I think it's because our efforts are based upon four principles:

- Start simple
- Work methodically
- Standardize techniques
- Display the model effectively

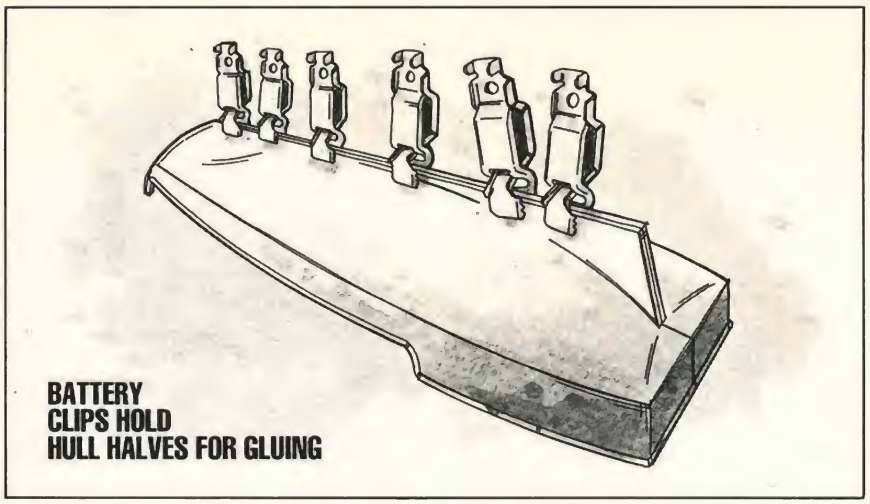
The Heller La Sardane — Here's how 14-year-old Mark Kittleson of Brown Deer, Wisconsin (who's won six ship modeling trophies, but had never built a model of a sailing vessel) applied these principles when building Heller's 1/50 scale "La Sardane." This is a model of a small lateen-rigged Mediterranean fishing boat; the kit contains only 29 parts and can be assembled in two or three evenings. The completed model is about 8" long, so can be displayed on a bookshelf or mantel without consuming an inordinate amount of space.

Hull assembly — Mark joined the hull halves, aligning them as evenly as possible so as to minimize the amount of filling and filing that would be required along the keel. One of the neatest clamps at our workshop isn't even a modelbuilding tool, it's an electrician's battery clip! Mark used several battery clips along the keel to hold the halves of the hull in perfect alignment, applied liquid plastic cement with a small paintbrush to the seams inside the hull, and let the cement dry for 24 hours.

Enhancing wood grain — Rather than sit around doing nothing as we waited for the cement to dry, we gathered up all the remaining parts and airbrushed them with Floquil Engine Black (R10). This was the first step in achieving the wood-grain effect Mark was seeking. Mark immediately sprayed a coat of Floquil Earth (R81) on top of the black lacquer. That's right — Earth right over Engine Black. (If you're brush painting, apply a coat of Floquil Barrier first, so that the solvents in the color coats won't attack the plastic.)

When you buy your paint, also get a copy of Floquil's *Painting Miniatures*. Follow the instructions in this booklet and you'll obtain good results first time, every time. After the paint dried, Mark gently scraped the parts with a No. 25 X-acto blade, removing some of the Earth so that the Engine Black showed through, accentuating the molded wood grain. It's a simple technique, one that I teach all my students, and it always works.

Seam filling — Mark then returned to the hull. Sure enough, he had to fill the seam on the keel from stem to stern. Many beginners aren't aware



FINESCALE MODELER: A. L. Schmidt

Yard-supporting braces pass through a hole drilled in the mast.

that seams should be filled with automobile body putty or some other material such as Duratite Plastic Surfacing Putty. Mark applied the putty all along the seam, let it dry, and then removed excess putty with a fine-toothed file and wet-or-dry sandpaper. Tip: A large flat file is better than a small file because it's less likely to cut undulations along the keel.

Painting the hull — After eliminating the unwanted seam, Mark painted the hull with Engine Black and Earth and scraped the hull with a No. 25 blade. Having done this, he decided to add a little color to the hull by airbrushing the inside of the hull with Floquil Daylight Red (R135), after masking the outside to protect against overspray.

He thought the red looked fine, but wanted just a little more color. So, stuffing toilet paper inside the hull and masking the cap rail and the wales to protect against overspray, he airbrushed the upper part of the hull between the wales and cap rail with Floquil Penn Central Green (R37). This produced an attractive combination of exterior and interior colors, which became even more attractive when Mark brush painted the wales and cap rail with Engine Black.

He next placed the thwarts and the mast supports inside the hull, cementing them in place. When using liquid cement, we place the pieces together and apply the cement directly onto the seams or joints. Capillary action draws the cement into the seams. The paint wrinkles a little, but the wrinkles disappear when the cement dries. Mark then stepped the masts and cemented them in place.

Mark Kittleson runs a finger along the keel to check that the seam is smooth.

Linen sails — The kit includes two vacuum-formed plastic sails which could easily have been attached to the yards, but Mark decided he wanted linen sails. We measured the plastic sails so he could transfer their dimensions to fine linen cloth. Then, laying the panel of fabric on the workbench, Mark carefully drew the triangular shapes with a pencil and ruler, and drew lines to simulate the seams on the full-size sail.

Having cut his sails, he then tied them to the yards using a needle and thread. We use several thicknesses and colors of polyester carpet thread for cordage, always drawing it through a cake of beeswax first to eliminate most fuzz. We then hold the coated thread over a candle flame to melt the beeswax and singe off any remaining fuzz. Try it; it works great.

Billowing sails — Now Mark had two sails hanging limply from the yards. We usually stiffen sails to achieve a billowing effect by soaking them in a solution of water and cornstarch and sometimes weather them with dilute fabric dye, but this time we decided to experiment with an idea I had been kicking around for some months: We brushed the complete surface of each sail with cyanoacrylate cement! We were careful not to glue our fingers to the sail, and were especially careful not to breathe the toxic fumes given off when the cement cures. Mark now had two rigid sails. Billowing the sails was just as easy as making them rigid: We wrapped the sails around the yards just as you roll a window shade around its roller and then allowed the sails to spring open. Presto! Two billowing sails which will hold their shape permanently.

Rigging — By this point, Mark had developed a strong desire to improve on an already excellent model. This was just the time to become enthusiastic, because the next step was to rig the yards, sails, and masts. The rigging on a sailing vessel can make or break the model.

Two rings are molded near the top of each mast. These rings indicate where the yard lifts are to be wrapped and knotted in place. Mark went one step further than merely tying "granny knots." He drilled a hole running fore and aft at these locations, and by doing so created sheaves through which the fore and aft lifts could run. This added another touch of authenticity.

After securing a 12″ length of line to each end of the main yards, the running ends were run through the mast sheaves; forward end running from fore to aft and the after end running from aft to fore. This way they passed each other going in opposite directions as they met within the sheave. Pulling the running ends of the lines lifted the yard into position. Once the yard was in position the running ends were tied around supports in the hull and tucked in close to the mast.

The next step in rigging the yards was to secure braces to the bottom (foot) of each yard and run them aft, on both sides of the masts. These braces run all the way aft and are tied off where the helmsman could reach them without having to leave the tiller. These boats often sailed with a one-man crew, so everything had to be readily accessible. Mark conjectured that the owner of this vessel was a poor fisherman who could not afford a

Welnetz Studios

Meet Les Wilkins

Les Wilkins, shown here with his model of the Portuguese Royal Navy's *Pedro Nunes*, has built ship models for 18 years; many of his models are on permanent display at the Manitowoc Maritime Museum in Manitowoc, Wisconsin. An automobile service technician by profession, Les and his wife Darlene live just outside Milwaukee in Brown Deer, Wisconsin, where they moved after Les finished several tours of duty with the U. S. Air Force.

Les builds most of his models from plastic kits and has explained his techniques in his book HOW TO BUILD PLASTIC SHIP MODELS (Kalmbach, 1980).

As he mentions in the article, Les also teaches ship modeling classes at a Milwaukee hobby shop, and is especially proud that several of his students have become prize-winning modelbuilders. Les has also won many ship modeling trophies, but he prefers to talk of his young students' victories.

block and tackle, and who therefore cut sheaves in the sides of his boat near the cap rail and used these to run his rigging. Mark did the same thing by drilling holes with a pin vise, running the braces through, and securing them.

Next, he attached a smaller size thread to the loose corner of each sail and ran the running end aft to the last bench seat on the port (left) side where he tied it off. In nautical jargon this line is a "sheet." Without sheets, the sails would flap like so much laundry on a clothesline.

The final step in rigging the sails was to attach a line to the after edge of each sail about halfway up, running it across the face of the sail and then down to the mast cross brace. This line prevents the sail from bulging too far forward in the midsection.

As you can see, careful planning is the secret to successful rigging. Take your time, correct mistakes as you go, and double-check to make sure that all rigging could work on a full-size vessel.

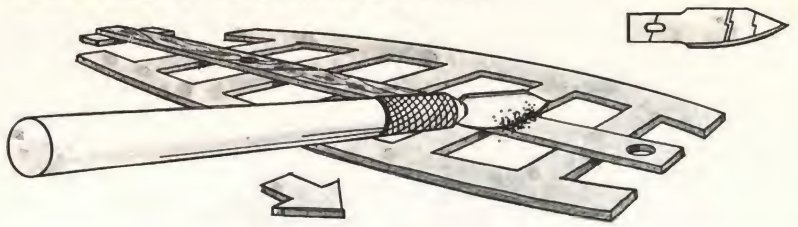
Display base — Mark did not care for the plastic display cradle included with the kit and decided to make his own. He correctly decided that a simple model like this would be overwhelmed by an ornate mount, so he made a simple base from an oak board. Mark sanded the base and applied several coats of satin-finish varnish. He cut down two brass pedestals (they were originally too long for such a small model) and inserted small shafts in the top of each pedestal. He drilled two small holes in the keel to accept these shafts and glued the shafts to the keel with a drop of cyanoacrylate cement.

Rope coils — The model was essentially complete, but Mark decided to add a couple more details. He made several coils of rope and cemented them in strategic positions throughout the model. Here's how to make rope coils: Obtain a metal rod several inches long and about ¼" in diameter. Mount the rod horizontally in a vise. Wrap the rod with spirals of carpet thread, forming coils about ⅛" long. Tie off the loose end of the thread. Liberally coat the coils with tube-type plastic cement and let dry for at least 24 hours. Cut the thread between the coils with a singe-edge razor blade or hobby knife, and gently slide the coils off the rod. They'll be rigid and won't look very good. Don't despair, they're supposed to look like that for now.

Pick up a coil with tweezers and place it on the model in an appropriate location. A crochet hook or knitting needle makes it easy to hold a coil in place. Now coat the coil with liquid plastic cement. The coil will immediately loosen, falling into position realistically. This is one of my standard techniques, and it's obviously one you can use for all sorts of dioramas, as well as ship models.

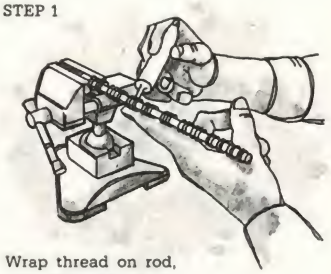
Fishnet — Mark wanted a fishnet for the model. He made the net from a piece of gauze bandage and dyed the gauze in coffee to simulate the color of hemp. He placed the net in the boat, draping part of it over the side and down onto the base. Mark laid the oars inside the boat, and the model was complete. FSM

ENHANCING WOOD GRAIN ON MOLDED PARTS



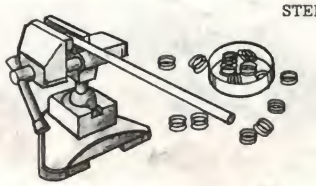
MAKING MINIATURE ROPE COILS

STEP 1



Wrap thread on rod, coat with tube-type plastic cement. Let dry 24 hours.

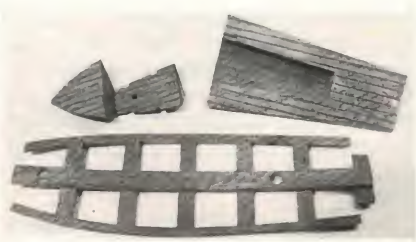
STEP 2



Cut the thread between coils with a single-edge razor blade or hobby knife and slide the coils off the rod.

STEP 3

Place the coils inside the boat and coat each with liquid plastic cement.



Mark painted these parts with Floquil Engine Black and Earth, then scraped them to bring out the wood grain.

Nearly 100 sandbags add the finishing touch to the author's M4A1 Sherman. Because each bag is actually full of dirt, it's easy to simulate damage from small-arms fire or shrapnel — just puncture the bag with tweezers, poke out some of the contents, and soak the rest with glue to keep it from spilling out.

Modeling sandbags the hard way

The subject is humble and the materials are commonplace, but the results are well worth the effort

BY GEORGE WOODARD

I'M ALWAYS looking for modeling techniques that will set off my models or figures to best advantage, and one of the best I've found is this method for making realistic sandbags.

The history of the sandbag — Far from being a modern development, sandbags have been around in one form or another since before the time of Christ. They came into wide use when the industrial revolution made mass production of cloth economical.

Sandbags have been the main ingredient in less-than-permanent fortifications since the First World War, and because of their simplicity and flexibility, they have been adapted to modern warfare. The mobile armies of today always have an ample supply of this basic item and the manpower to lay it down.

The sandbag is unique — and highly useful — in that it mutes the effects of all types of projectiles, even though they are designed to cause damage through different principles. When an armor-piercing projectile hits concrete, it penetrates, fragmenting the concrete with a disastrous shrapnel effect. When the same projectile hits sandbags, there is penetration but the round is slowed and there is much less shrapnel effect. Sandbags also absorb the blasts of high-explosive rounds, and dissipate the hot-gas jets of shaped charges such as HEAT.

Convincing miniature sandbags — Commercial scale sandbags, most of them plastic, leave a lot to be desired in terms of realism. Because they are rigid they can't be stacked realistically, nor will they bend or drape over irregular surfaces. One or two of the cast-plaster revetments are a little bit better, but in the end I consider all commercial sandbags inferior to home-built ones.

In approaching any new modeling challenge, one avenue I always explore is to make the model the way the real thing is made, that is, to simply duplicate the real thing in miniature. For sandbags, this approach works very well. I build the sandbags in miniature, substituting tissue paper for coarse fabric, and fine dirt or foundry sand for coarse sand.

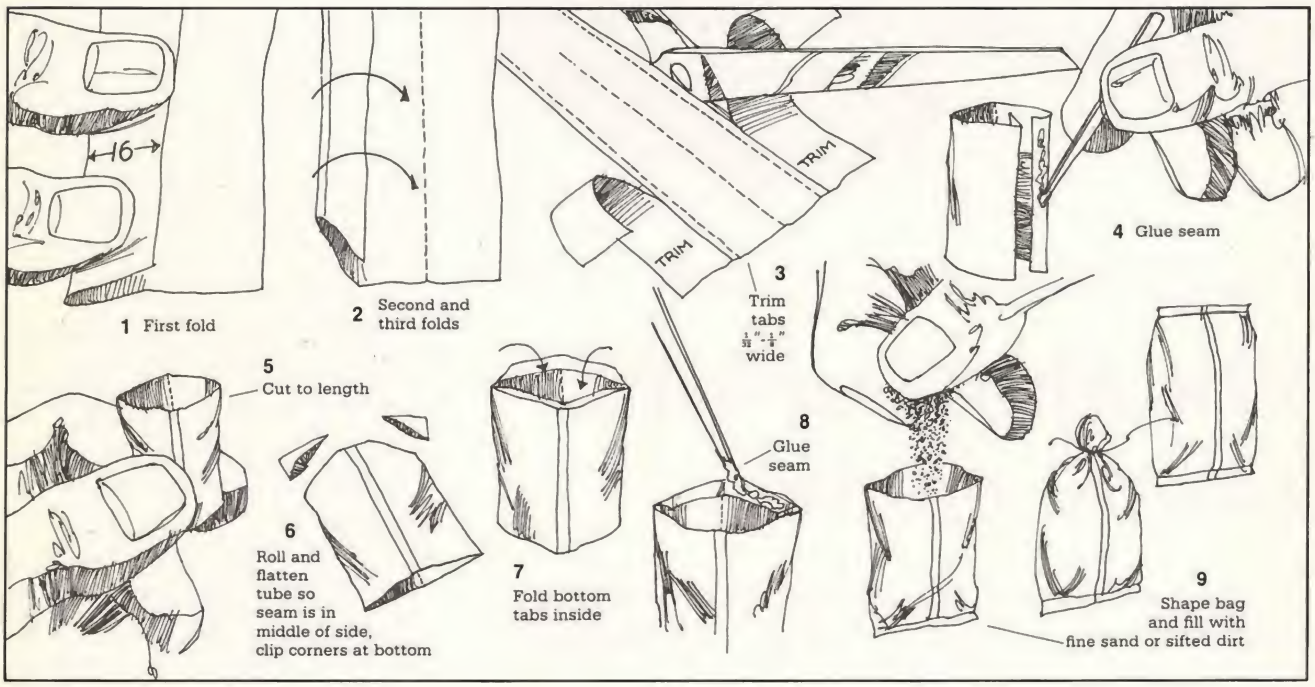
You should already have the tools you'll need: tweezers, scissors, white glue, toothpicks, and the toilet tissue of your choice. My choice, by the way, is a single-ply commercial-grade toilet paper chosen not for softness but for strength and texture.

Step by step — The steps are simple. First make a single fold, with the folded flap about 16 scale inches wide. The width of the folded portion determines the width of the finished bag. Next fold the tissue back over itself, and then fold it once more, this time around the original fold.

Now open the folded tissue and trim off all but 1/32" to 1/8" of the two outer flaps. These flaps will end up on the inside of the finished bag, and trimming them now makes it easier to apply glue to the seam. Also, less excess tissue inside the bag will make it easier to fill with dirt later on.

Form the folded and trimmed tissue into an oblong tube, and run a small bead of white glue down the seam, using a toothpick as an applicator. Don't use much glue; it only takes a little. After the seam dries, cut the tissue tube into scale-length sections; mine are about 22" long. Now reshape the tube so that the seam falls near

Aside from the gun, its associated hardware, and the figures, the main ingredient in this German flak emplacement scene is several dozen of the author's handmade scale sandbags.



the middle of one side, rather than at the edge.

Next, trim the corners of one end of each bag. Fold in the notched ends and run a bead of white glue along the seam. Try to press the seam together in such a way as to force excess glue to the outside, where you can wipe it off. When the bottom seam dries, the basic bag is finished, ready to be filled.

Filling and stacking — Fill the bag with finely sifted sand or dirt, then either fold the top and glue as you did the bottom, or tie off the top with fine thread. Do not overfill; if there is too much dirt or fine sand inside the bags, it will be difficult to stack them realistically.

Use white glue to stack the bags, and after you are satisfied with the arrangement, run a cyanoacrylate adhesive such as Super Glue, Hot Stuff, or Zap over the piles. This glue will seal the bags and add lots of strength, but will not fill in the cloth-like texture you've worked so hard to achieve. When dry, paint the sandbags using any of your favorite methods.

It takes a few tries to get the hang of making these scale sandbags, so don't be discouraged by a few ugly ones, and above all, don't throw away your first attempts because they don't come out plump and perfect. It takes a lot of sandbags to make even a low wall or to cover the thin side armor on a Sherman, and your imperfect first tries can simply be the bags on the bottom of the pile! **FSM**

FINESCALE MODELER: A. L. Schmidt

Every sandbag need not be perfect: Use the less-attractive ones on the bottom of the pile, and save the best for the most visible locations.

Meet George Woodard

George Woodard's primary modeling interest is armor, though he admits to building a few figures now and then. His armor models have won numerous prizes in regional and national competition. George graduated from the University of Missouri in 1968, where he played football. Married, with one daughter, age 4, he works with his brothers at Woodard Rug and Drapery, Inc., a firm which manufactures and cleans draperies, carpets, and furniture. George is 35 and lives in Kirkwood, Missouri.

Yellow ochre chalk simulates road dust. Here, the chalk powder is being brushed onto the fender of this jeep and allowed to accumulate in the corners.

Weathering with pastel chalk

A basic technique that's been around a long, long time — if you haven't tried it, you should

BY JACK GURNER

MODELBUILDING FADS flare up and soon fade away. However, good modelbuilding techniques start slowly and gain wide acceptance over the years. Such is the case with pastel chalk. Pastel chalk has long been recognized as a versatile weathering medium — one that is suitable for everything from mud on an infantryman's boots to extraterrestrial residue on an alien spaceship.

Preparing the chalk — Although individual sticks are available at art supply stores, you should consider starting with a set containing about two dozen sticks in as many colors, fig. 1. You won't use all of the colors at first, but they're good to have on hand for future projects.

If you purchase individual sticks, buy black, white, and a selection of earth colors. These are adequate for basic weathering because they can be mixed to create different shades, fig. 2. Expect to pay from 60 cents to a dollar each. You'll also need several watercolor brushes to apply the dust; any worn-out brushes will do.

Hang a sign that reads "DON'T OVERDO WEATHERING" beside your work area: Weathering should almost always be subtle. Junkyards, burned aircraft, and abandoned spaceships can be heavily weathered, but these are exceptions to the rule that light weathering is best.

There are two good methods for obtaining fine powdered color from the sticks of chalk. One is to rub the chalk on a piece of sandpaper. However, I prefer to scrape the blade of my hobby knife on the side of the stick. Hold the stick at an angle above a piece of white paper and scrape downward with the knife to obtain a pile of chalk, fig. 3. A third method, one I don't recommend, is to wrap the stick in a piece of paper and beat it with a hammer. Store the resulting powder in a small bottle.

FIG. 1. You can buy sets of pastel chalks at any art supply store. Although this set contains many more colors than the earth shades needed for basic weathering, the additional chalks are good to have on hand for future projects. Tools needed include a couple of brushes and a hobby knife. The brushes and the knife blade needn't be new.

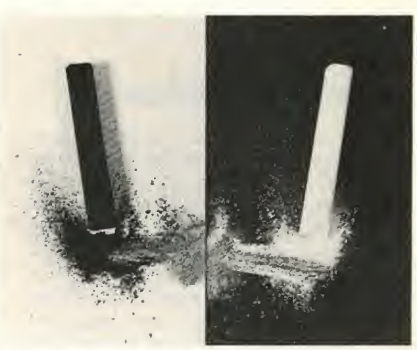


FIG. 2. Basic weathering can be accomplished with a few colors such as ochre, rust, earth, black, and white. These can be intermixed to make a variety of shades and can be lightened or darkened with white or black.

FIG. 3. Obtain pastel chalk powder by scraping the blade of a hobby knife downward against the side of the stick.

Practice sessions — Applying the powdered chalk is simply a matter of picking some up with a brush and scrubbing, brushing, or flicking the powder onto the model. Brushing produces smooth patches the width of the brush. Scrubbing makes splotchy patches. If you tap the brush like a smoker flicking cigarette ashes, you'll get a spattered effect. The chalk adheres best to flat paints.

Practice sessions with an old model will quickly reveal the different effects you can achieve. A good starting point is to apply a scale coat of dust to the model. In real life, dust accumulates most heavily in corners, cracks, nooks, and crevices, while broad surfaces have just a light coat. Scrape a pile of powder from your yellow ochre (a light earth color) chalk stick. Pick up some powder with the brush and apply it to the model, starting in the center of an exposed surface and working toward

FIG. 4. Handle a weathered model carefully: Full-size fingerprints won't enhance the appearance of your project. To avoid prints, protect the model with a coat of flat clear fixative.

FIG. 5. Apply pastel chalk with a well-worn watercolor brush. If you want the greatest variety of textures and colors, don't apply spray fixative.

the edges. Let some of the excess pile up in and around corners and crevices. If the coating is too heavy, blow gently and look again. Repeat the process until the dust looks right. Chalk, by the way, is a mild abrasive, so don't brush the model too vigorously or you may mar the paint.

When you are happy with the dust on the practice model, gently press a fingertip against the dusted surface, fig. 4. You should leave a fingerprint Sherlock Holmes would be proud of! Let it serve as a warning that you have to handle the model carefully while applying pastel chalk.

Fixatives — To prevent leaving out-of-scale fingerprints on your weathered models, you can protect your work with a spray coat of clear flat fixative such as Testor Dullcote. Experiment with several brands until you find the one that works best for you. I've heard that some modelers use hair spray as a

FIG. 6. Black and dark rust are being applied to the engine of this tank. This heavy coating will be sealed with fixative, then a few patches of a lighter shade of chalk will be added.

FIG. 7. Use your imagination when applying brightly colored pastel chalks to models of fantasy spacecraft.

FIG. 8. Create extraterrestrial "weathering" with fluorescent pastel chalks such as these from Weber Costello. Nobody can say your effects are unrealistic!

fixative. Be aware that some hair sprays dry milky white: Best stick to products made for modeling!

The only problem with a fixative is that it sometimes homogenizes the weathering. I prefer to leave the model uncoated, so that each weathered patch reflects light differently, fig. 5.

Now that you are learning how to apply pastel chalk, the next question is where to apply it. Photos of the real thing in action are the best references. Lacking these, common sense tells you that there will be black smudges around exhaust ports and rust around exposed bare metal, fig. 6. Remember, if you are unsure about weathering, lean toward the underweathered effect.

Out-of-this-world — Conventional colors are fine for conventional models. However, with science fiction models, pastel chalk can be used for out-of-this-world effects. I apply patches of bright red, yellow, green, and blue to my fantasy spacecraft models, fig. 7. Who knows what color the blast from an alien weapon might leave on a spaceship? Weber Costello even manufactures a set of fluorescent pastel chalks, fig. 8, that glow vibrantly under ultraviolet light — just think of the possibilities!

Because the model's finish is the first thing seen by the casual viewer or hard-nosed contest judge, you should use every available technique to make a good first impression. Subtle pastel chalk weathering can provide the winning edge. FSM

Meet Jack Gurner

Jack Gurner, 32, of Memphis, Tennessee, is a professional photographer and free-lance writer; his hobbies include building and photographing fantasy spacecraft. Jack is regional coordinator for the South Central Region of the International Plastic Modelers Society/U. S. A.

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Choosing and using your first airbrush

Specific recommendations for beginners, as well as some valuable hints and tips for experienced modelers

BY BOB HAYDEN

I'M A FIRM BELIEVER that the old saw "it's not the gun, it's the gunner" is completely applicable to modeling. In other words, fancy, expensive tools don't make better modelers — only practice and attention to detail will do that. However, one "fancy" tool that will more than pay for itself in your workshop is an airbrush.

Airbrushes were originally developed for artists, but nowadays they're used for everything from photo retouching, to taxidermy, to cake decorating, to (of course) modeling. In fact, it's important for us modelers to think of airbrushes not as artist's tools, but as the little brothers of the high-quality spray guns used to achieve fine finishes in industry.

As a paint applicator for modeling, an airbrush is superior to both brushes and spray cans, because only an airbrush can apply very thin, even paint coats, coats thin enough to cover without obscuring detail. An airbrush can also apply minute amounts of paint for weathering, camouflage, and special effects that would be difficult or impossible to achieve otherwise.

Choosing the right airbrush — There's more than one kind of airbrush, and while most are suitable for modeling, some are more suitable than others. Airbrushes are classified by whether the control button governs only the flow of air (single-action), or both air and paint (double-action), and whether paint is mixed with air inside the body of the airbrush (internal mix) or outside (external mix), fig. 1.

The most complex and expensive airbrushes are double-action, internal mix types. While they offer the greatest control over paint volume and spray pattern, they are hard to clean and difficult for a beginner to learn to use. I've owned one for years, but I use it only about as often as I use a 250 mm lens on my 35 mm camera. For 95 percent of my modeling tasks, a simpler airbrush works better.

Next come single-action, internal mix airbrushes. These are easy to learn to use, and work well for modeling. Their only drawback is that they are more difficult to clean than an external mix type, because the paint and air are mixed inside the body of the airbrush.

Recommendation: single-action, external mix — Single-action external mix airbrushes are the simplest and least expensive type, and the type I like best for modeling, fig. 2. This type of airbrush is easy to clean, which means you'll be likely to use it more often than a tool that takes half an hour to field-strip and rebuild, and best of all, it's the easiest to learn to use, and that alone makes it ideal for your first airbrush.

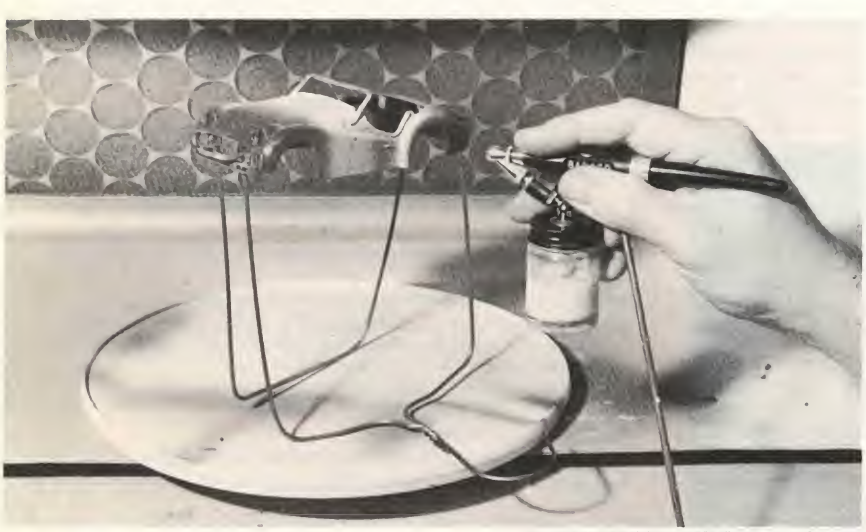
A recommendation? Choose a middle-of-the-range single-action, external mix machine with a medium tip, such as a Paasche H (with H-3 tip), Binks Wren (Model B), or Badger 350 (Model 350-1-M).

The other things you'll need — Unfortunately, an airbrush isn't the only thing you need to start airbrushing. The most important item after the airbrush itself is a source of compressed gas to power it. Here you have several choices.

Hobby shops sell small disposable cans of compressed gas — usually it's the same propellant used for spray cans — for use with airbrushes, fig. 3. While these are adequate, if you build more than two models a year they quickly become expensive.

Technically speaking, the best source of compressed gas is a large cylinder of carbon dioxide or compressed air. However, such cylinders are expensive to buy or rent, must be refilled, and are difficult to move in and out of your workshop.

Recommendation: a hobby compressor — Even if you're just starting out with your first airbrush, I recommend purchasing a small air compressor, fig. 4. The simplest, least expensive type, a



All photos: FINESCALE MODELER, A. L. Schmidt

A coat hanger stand and a kitchen turntable ensure that this model won't have to be handled while it is painted, leaving the modeler free to manipulate the airbrush.

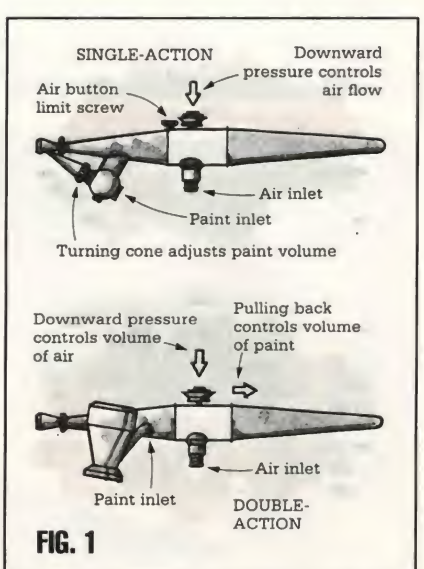


FIG. 1

FIG. 2. This single-action, external mix Binks Wren "B" is one of three simple airbrushes recommended for beginners. This type is easy to use and easy to clean.

diaphragm compressor, will provide all the air you need, requires almost no maintenance, and will last for years. Cost, with a moisture trap, is around one hundred dollars. Mine, purchased 15 years ago and used for hundreds of hours since, is still going strong. By the way, if you have a shop air compressor you can use it for your airbrush as long as the pressure can be regulated down to about 15 psi.

Some compressors come with a pressure regulator, others don't, fig. 5. While you can get by without one, a regulator should be a high-priority purchase once your modeling budget recovers from the shock of the airbrush and compressor.

Color cup or bottle? — To hold the paint supply, airbrushes come with color cups (small, open-top cups), with bottles, or both. Even if your airbrush comes with a cup, I suggest you purchase and use a color bottle to hold the paint. The bottle holds enough to paint an entire model, and because it has a cap you're less likely to spill paint when using it.

About spray booths — A small spray booth, fig. 6, is a worthwhile acquisition for three reasons, especially if you're going to be doing a lot of airbrushing. First, by causing a flow of air through the spraying area, the spray booth prevents overspray from bouncing off nearby objects and falling on the model.

Second, the booth fan and filter capture paint particles that would otherwise float around in the air, where they can be inhaled. (Most paint pigment, if not downright poisonous, is far from beneficial to your insides.)

Finally, if properly vented outdoors, a spray booth will remove paint solvent odors from your workshop. This is especially important when you work in a room used by the rest of the family, and if you use strong-solvent paints such as Floquil, the ventilation it provides is vital to your health. Even a secondhand range hood is better than nothing, but be aware that for use with flammable solvents the spray booth should have an enclosed, sparkproof motor.

FIG. 3. Small cans of pressurized gas are available for use with airbrushes, but a hobby compressor is more economical.

PAINT DILUTIONS FOR AIRBRUSHING:

Paint	Parts Color	Thinner	Parts Thinner	Air Pressure	Notes
Floquil, Flo-Paque[1]	3	Dio-Sol	1	12-20 psi	Add 5% Glaze
Humbrol[2]	1	Mineral spirits	1	25 psi	
Pactra enamel[1]	1	Formula-U (spray) No. 20132*	1	15-20 psi	Formula U is the thinner for Pactra's fuel-proof polyurethane paint
Polly S[1]	10	Water	1	25 psi	
Polly S[2]	3	Rubbing alcohol	2	18-20 psi	Alcohol acts as drying agent
ScaleCoat[1]	1	ScaleCoat thinner	1	none	
Testor enamel (flat)[1]	3	VM&P naphtha	1	none	VM&P naphtha is available at paint stores. Lighter fluid also works.

These formulas are for straight painting with standard colors. Increase dilution for colors to be used for weathering, and reduce dilution when spraying metallics.
[1] Manufacturer's recommendation
[2] Deviates from manufacturer's recommendation, or manufacturer's recommendation not available
* In very hot or humid weather, add 10%-15% Formula-U Brushing thinner to improve the spraying characteristics of the paint.

Using your airbrush: preparing the paint — You must do two things to prepare paint for airbrushing: thin it and strain it. Thinning is necessary just so the airbrush will properly atomize the paint into a fine spray, and straining will help keep the airbrush from clogging.

Don't take the advice of the guy who says: "I just jack up the pressure to 45 pounds and spray paint full strength." Your best bet for obtaining a high-quality finish is to thin the paint and apply it as recommended by the paint maker and the airbrush manufacturer. The table above provides guidelines for thinning hobby paints.

For paints not listed in the table, experiment by cutting the paint with from 15 to 50 percent thinner. Different paint brands and even different colors within a brand require varying amounts, but generally, light colors must be thinned more than dark colors, because light paints have more and heavier pigment in them.

Properly thinning and straining the paint eliminates 90 percent of airbrush clogging. You can thin the paint through a fine tea strainer, enamel-washing strainer, or fine carburetor screening, or you can use one of the new "in the bottle" strainers, fig. 8, offered specifically for use with an airbrush bottle siphon. It's amazing how much material straining will remove from a new bottle of paint.

Using your airbrush: preparing the model — Just as for other painting methods, models that you are going to airbrush must be clean, dry, and dust-free. Holding the model during painting is important, because you'll usually have one hand tied up with the airbrush, and you don't want a painting operation to become a juggling act.

Depending upon the shape of the

FIG. 4. This typical diaphragm compressor is made for use with airbrushes. It provides clean air at about 27 psi.

FIG. 5. Here's a deluxe W. R. Brown Intermatic hobby compressor with a holding tank and pressure regulator.

model, I use bent-up coat hangers, a stick with foam rubber wrapped around one end, a paper towel tube, or an inexpensive plastic turntable to hold the model. In the rare case when nothing but the old Mk. 1, Mod. 0 hand will do, I wear a disposable vinyl examination glove to keep paint off my hand and finger oils off the model.

Starting to paint — With paint and model prepared, start the compressor, depress the button on the airbrush, and adjust the pressure to 20 psi while the brush is passing air. You'll find you have the best control at pressures between 15 and 20 psi, but very thin paints, such as colors thinned for weath-

FIG. 6. This hobby spray booth is made by Precision Manufacturing Co., 4546 Sinclair Rd., San Antonio, Texas 78222.

ering, can be applied at between 8 and 10 psi.

Now load the paint into the color bottle and practice spraying on a box top, a tin can, or (best of all) a scrapped model. Vary the setting of the color control (the needle, for internal mix airbrushes), and adjust the airbrush until you can apply a smooth, even coat of paint. Control — of the pressure, spray pattern, and paint consistency — is what this tool is all about, and you should be able to adjust the airbrush until you can paint along at your own pace without hurrying. Keep the airbrush moving so you don't cause puddles or sags.

Routine spraying — Now it's time to try your hand at airbrushing a model. Hold the airbrush 3" to 6" from the surface to be painted, and keep it moving while you build up thin coats of paint —

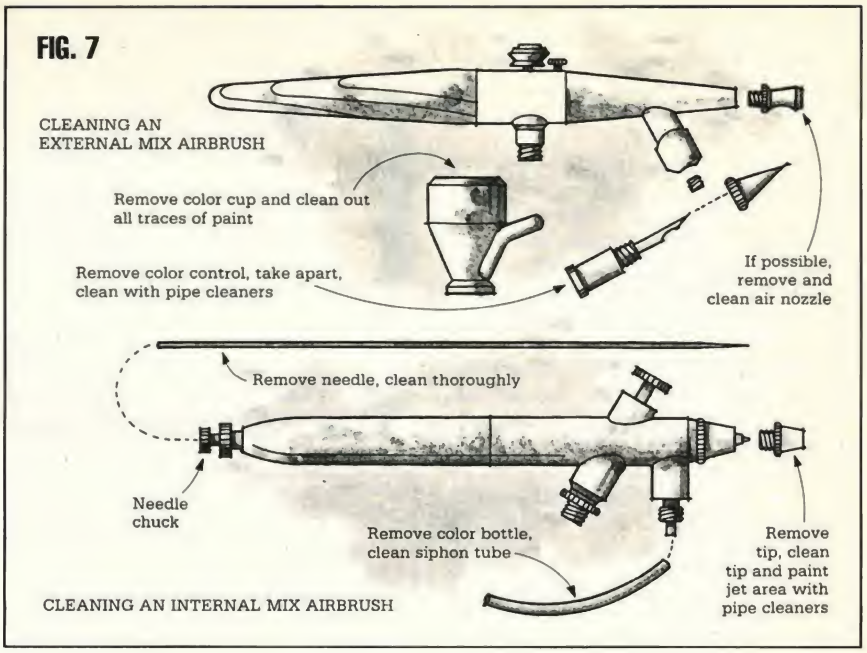
just enough to cover. I usually paint recesses and areas such as landing gear housings and join lines where wing roots meet the fuselage first, then go back and cover flat or gently rounded surfaces last.

While you're spraying, remember to stop occasionally. There's a tendency to be drawn into the work when airbrushing, and this can cause you to apply too much paint, especially when weathering. The solution is simple: stop every now and then and look around the shop for a minute or two.

Troubleshooting a clog — The problem that comes up most often during airbrushing is a paint clog. Straining the paint eliminates most clogs, but when it happens (and it will), don't throw the brush against the wall (believe me, I've been tempted). Instead, put the model aside, where you won't spill something on it or knock it over, stop the compressor, and determine the cause of the clog. The places to look, in order, are:

- The color control tip, or the tip of the needle.
- The siphon tube, or the color cup.
- The air hole in the top of the color bottle. If this is blocked, paint won't flow.

Regardless of the cause of the clog, the remedy is usually to stop and clean the paint passages of the airbrush and paint bottle siphon before continuing.



Cleaning and maintenance — As soon as you're through painting, move the model safely out of the way and clean the airbrush immediately, fig. 7. Most problems with airbrushes are caused by lack of thorough cleaning. Be aware that the instructions for your airbrush may not take into account the kinds of paint we use for modeling, which, compared to artist's paints and inks, are closer to glues. You've got to get every bit of paint out of the airbrush before you put it away, and wipe down the outside, too.

Start by removing the color cup or bottle, opening the color control wide, and spraying into a rag until the airbrush runs out of paint. Then rinse

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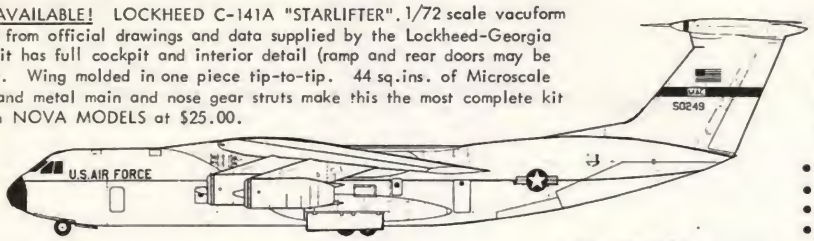

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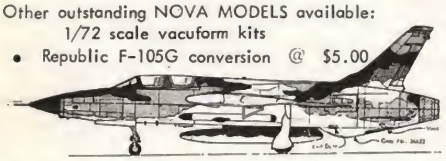

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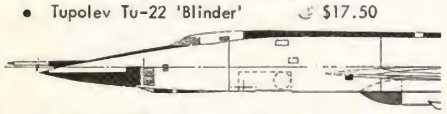

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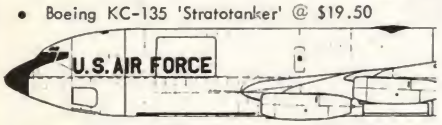

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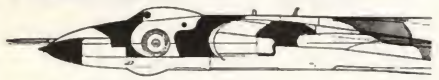

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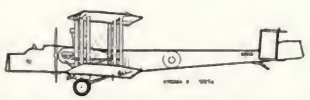

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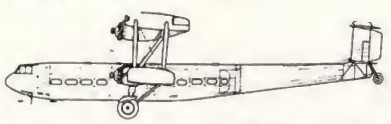

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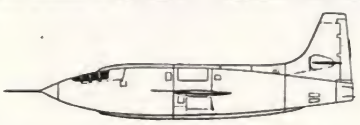

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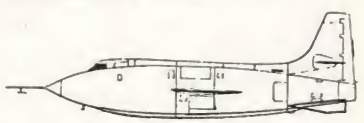

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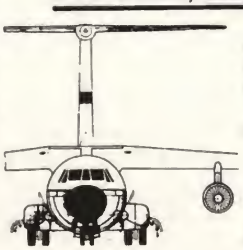

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FIG. 8. These new paint filters from Badger and K-Tool help eliminate clogs.

FIG. 9. External mix airbrushes are easy to clean, so clean them thoroughly.

the color cup or bottle with solvent and fill it with clean solvent. Spray solvent into a rag, then hold the rag against the tip of the airbrush, deflecting air back into the paint passages.

Complete the job by cleaning the paint passages with cotton swabs and pipe cleaners, fig. 9. Never force the pipe cleaner where it won't fit — doing

so can ruin an airbrush — but gently poke the pipe cleaner wherever you can. On internal mix airbrushes (the type with needles), make sure every last trace of paint is removed from the needle and the needle bearing; I've seen internal mix airbrushes literally welded together (and ruined) because paint was allowed to dry on the needle and in the needle bearing. By the way, I store the needles for my internal mix airbrushes separately, with the points protected in a block of scrap Styrofoam.

Two final words of advice — Before you charge off to learn all the rest there is to know about airbrushes and airbrushing — and there's a great deal more — here are two things to take with you. First, scrupulous cleanliness is the difference between good and bad results with an airbrush. In many ways, the cleanup job you do after an airbrushing session is the most important single step in ensuring the success of the next one.

Finally, carefully read the manufacturer's instructions for your airbrush, your compressor, and for the paint you intend to use. What I've offered here is general advice compared to the information included by the makers of the equipment. Read and follow the manufacturer's recommendations and you'll find airbrushing is a pleasure — every time! **FSM**

All photos, FINESCALE MODELER: A. L. Schmidt

FIG. 1. The finished 1/96 scale steam tug conversion on the left is built on a waterlined version of the hull resting on the plastic cradles at right.

Waterlining

This works for boats, amphibious planes, or anything else that is at home on or in the water

DIORAMAS that include water, as many of the interesting ones do, often require that a model be partially sunk into it. Usually, it's far easier to cut down the model than to make the water deep enough to accommodate the full depth of the hull or floats.

To waterline a boat, amphibious plane or tank, or any model that is to appear waterborne, the first step is to assemble the portions of the model where the cuts must be made. Where the kit includes a stand, fig. 1, I glue it right to the hull to hold the hull level while marking the waterline.

Marking the waterline — Next, set the hull up level on a flat surface, fig. 2. The photo shows a Panavise surface plate, but you can also use a sheet of glass. Decide where the waterline should be (except for a hydroplane "on the step" or a flying boat about to lift off, most models look better with only a small amount of hull showing), then mark it all around with a height gauge. The photo shows a machinist's height gauge and a substitute made of a block of wood and a sharpened length of coat hanger wire that works just as well.

Cutting away the hull — Once the hull is marked all around, cut away the bottom portions with whatever tool you like, leaving from 1/32" to 1/64" of extra material below the finished waterline. My favorite method of doing this is to use a fine steel saw blade (Dremel No. 406) in a motor tool.

Smoothing the bottom — After cutting the hull, reinforce it with lateral bulkheads if necessary, then sand the cut edges smooth. I rubber cement a sheet of coarse (about 50 grit) sandpaper to a piece of window glass and rub the model over it using a circular motion, fig. 3. At this point you should consider sanding a fraction of a degree of tilt, or list, to the model to add a touch of drama and realism. Small models, such as individual floats or ship's boats can often be waterlined simply by sanding the bottoms flat, without cutting beforehand.

If the model is to merely rest on top of the diorama water, continue sanding until the bottom is perfectly flat, but if it is to be incorporated into the water, sand away only enough material to eliminate obvious bumps and gaps. Some models may require a reinforcing flat bottom inside the waterlined hull, but in most cases you can simply leave the bottom of the hull open and proceed with the rest of construction. — *Bob Hayden* **FSM**

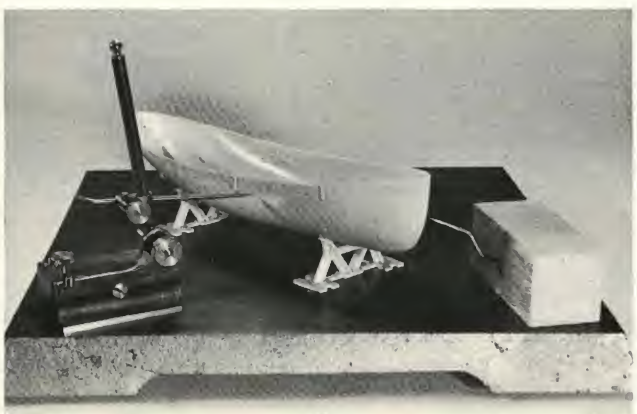

FIG. 2. The first step in waterlining a model is to set it up level and carefully scribe the waterline with a height gauge. The homemade wood-and-wire gauge on the right works just as well as the fancy machinist's gauge at left.

FIG. 3. After cutting the bottom portion of the model away, the waterlined hull must be smoothed. This boat hull has been reinforced with bulkheads of .090" ABS so that the sides won't deflect as the hull is rubbed over a sheet of coarse sandpaper.

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